

**Navy Advancement Center**

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# **Advancement Handbook for Fire Controlman**

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## **PREFACE**

The purpose of the Advancement Handbook is to help you focus your preparation for Navywide advancement-in-rating examinations. The bibliographies (BIBs) together with this handbook form a comprehensive examination study package. Since this handbook provides skill and knowledge components for each paygrade of the FC rating, it helps you concentrate your study on those areas that may be tested. This feature will help you get the most out of your study time.

Each page in Parts 1 through 4 of this Advancement Handbook presents general skill areas, specific skill areas, the knowledge factors associated with each skill area, the pertinent references that address each skill, and the subject areas that may be covered on the examination. The skill statements describe the skills you are expected to perform for each paygrade. The skill statements are cumulative; that is, you are responsible for the skills for the paygrade you are competing for, your present paygrade, and all paygrades below.

Although this handbook is very comprehensive, it cannot cover all the tasks performed in the rating. As a result, the advancement examinations may contain questions more detailed than described in the “*Exam Expectations*” section of the skill areas.

Remember that advancement competition is keen, so your keys to advancement include not only comprehensive advancement examination study but also sustained superior performance.

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## Part 1

### Advancement Handbook for FC3

## Advancement Handbook for FC3

General FC <i>Skill Area</i>	<b>Electrical/Electronic Maintenance</b>
A <i>skill</i> you are expected to perform from the General Skill Area above:	<b>Inspect equipment shielding and rubber matting</b>
<i>Knowledge</i> you should have to perform this skill:	<ul style="list-style-type: none"> <li>• Acceptable and unacceptable physical characteristics of equipment shielding and rubber matting</li> <li>• How to inspect equipment shielding and rubber matting</li> </ul>
<i>References</i> you should study to gain the knowledge you need to perform this skill:	<ul style="list-style-type: none"> <li>• <i>Industrial Electromagnetic Compatibility Work Process Instructions</i>, NAVSEA STD 407-5287561 REV B</li> <li>• <i>Shipboard Bonding, Grounding, and Other Techniques for Electromagnetic Compatibility and Safety</i>, MIL-STD 1310</li> <li>• <i>Navy Installation and Maintenance Book (NIMB) Installation Standards</i>, NAVSEA SE000-01-IMB-010</li> <li>• <i>The Technician's Handbook</i>, NAVEDTRA B72-19-00-92; (NEETS MOD 19)</li> <li>• NSTM CHAP 090; <i>Inspections, Tests, Records, and Reports</i>, NAVSEA S9086-CZ-STM-000</li> </ul>
<i>Exam Expectations.</i> These are subject areas you should know to help you answer exam questions correctly:	You can expect questions on the physical characteristics of equipment shielding and rubber matting and inspections to determine their serviceability.

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General FC <i>Skill Area</i>	<b>Electrical/Electronic Maintenance</b>
A <i>skill</i> you are expected to perform from the General Skill Area above:	<b>Measure circuit characteristics (AC &amp; DC voltages &amp; current, circuit resistance, capacitance, etc.)</b>
<i>Knowledge</i> you should have to perform this skill:	<p>How to:</p> <ul style="list-style-type: none"> <li>• Use test equipment</li> <li>• Measure AC, DC, AC voltages, DC voltages, circuit resistance, capacitance, inductance, frequency, and power</li> <li>• Perform appropriate electrical/electronic testing procedures</li> </ul>
<i>References</i> you should study to gain the knowledge you need to perform this skill:	<ul style="list-style-type: none"> <li>• <i>Introduction to Matter, Energy, and Direct Current</i>, NAVEDTRA B72-01-00-92; (NEETS MOD 1 Ch3)</li> <li>• <i>Introduction to Alternating Current and Transformers</i>, NAVEDTRA 172-02-00-91; (NEETS MOD 2)</li> <li>• <i>Introduction to Generators and Motors</i>, NAVEDTRA B72-05-00-94; (NEETS MOD 5)</li> <li>• <i>Introduction to Wave-Propagation, Transmission Lines, and Antennas</i>, NAVEDTRA B72-10-00-93; (NEETS MOD 10)</li> <li>• <i>Introduction to Circuit Protection, Control, and Measurement</i>, NAVEDTRA B72-03-00-93; (NEETS MOD 3)</li> </ul>
<i>Exam Expectations.</i> These are subject areas you should know to help you answer exam questions correctly:	You can expect questions on measuring AC, DC, AC & DC voltages & current, circuit resistance, capacitance, inductance, frequency, and power.

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General FC <i>Skill Area</i>	<b>Electrical/ Electronic Maintenance</b>
A <i>skill</i> you are expected to perform from the General Skill Area above:	<b>Measure transmission line standing wave ratio</b>
<i>Knowledge</i> you should have to perform this skill:	How to: <ul style="list-style-type: none"> <li>• Measure transmission line characteristics</li> <li>• Measure transmission line time differentials</li> </ul>
<i>References</i> you should study to gain the knowledge you need to perform this skill:	<ul style="list-style-type: none"> <li>• <i>Introduction to Wave-Propagation, Transmission Lines, and Antennas</i>; NAVEDTRA 172-10-00-83; (NEETS MOD 10)</li> </ul>
<i>Exam Expectations.</i> These are subject areas you should know to help you answer exam questions correctly:	You can expect questions on measuring transmission line characteristics and time line differentials.

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General FC <i>Skill Area</i>	<b>Electrical/Electronic Maintenance</b>
A <i>skill</i> you are expected to perform from the General Skill Area above:	<b>Analyze circuit waveforms, electronic component signatures, bandwidths and modulations</b>
<i>Knowledge</i> you should have to perform this skill:	How to: <ul style="list-style-type: none"><li>• Use test equipment</li><li>• Critically examine electronic circuits</li><li>• Reduce signals to their simplest form</li><li>• Inject signals</li></ul>
<i>References</i> you should study to gain the knowledge you need to perform this skill:	<ul style="list-style-type: none"><li>• <i>Introduction to Wave-Generation and Wave-Shaping Circuits</i>, NAVEDTRA 172-09-00-83; (NEETS MOD 9)</li></ul>
<i>Exam Expectations.</i> These are subject areas you should know to help you answer exam questions correctly:	You can expect questions on analyzing circuit waveforms, electronic component signatures, bandwidths, modulations, and injecting signals.

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General FC <i>Skill Area</i>	<b>Electrical/Electronic Maintenance</b>
A <i>skill</i> you are expected to perform from the General Skill Area above:	<b>Determine electronic component characteristics and values</b>
<i>Knowledge</i> you should have to perform this skill:	How to: <ul style="list-style-type: none"> <li>Identify and determine electronic characteristics/values (interpret, measure, etc.)</li> </ul>
<i>References</i> you should study to gain the knowledge you need to perform this skill:	<ul style="list-style-type: none"> <li><i>Introduction to Solid –State Devices and Power Supplies</i>, NAVEDTRA B72-07-00-92; (NEETS MOD 7 CH 1)</li> <li><i>Introduction to Wave-Generation and Wave-Shaping Circuits</i>, NAVEDTRA 172-09-00-83; (NEETS MOD 9 CH 2)</li> <li><i>Principles of Synchros, Servos, and Gyros</i>, NAVEDTRA B72-15-00-93; (NEETS MOD 15 CH 3)</li> <li><i>Mathematics, Volume 1</i>, NAVEDTRA 10069-D1, <i>Volume 2A</i> NAVEDTRA 10062, <i>Volume 2B</i> NAVEDTRA 10063, and <i>Volume 3</i> NAVEDTRA 10073-A1</li> </ul>
<i>Exam Expectations.</i> These are subject areas you should know to help you answer exam questions correctly:	You can expect questions on determining electronic component characteristics and values.

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General FC <i>Skill Area</i>	<b>Electrical/Electronic Maintenance</b>
A <i>skill</i> you are expected to perform from the General Skill Area above:	<b>Adjust and align synchros and servos</b>
<i>Knowledge</i> you should have to perform this skill:	<ul style="list-style-type: none"><li>• Principles of operation</li><li>• Adjusting procedures</li><li>• Aligning procedures</li></ul>
<i>References</i> you should study to gain the knowledge you need to perform this skill:	<ul style="list-style-type: none"><li>• <i>Principles of Synchros, Servos, and Gyros</i>; NAVEDTRA B72-15-00-93; (NEETS MOD 15 CH 3)</li></ul>
<i>Exam Expectations.</i> These are subject areas you should know to help you answer exam questions correctly:	You can expect questions on synchro and servo characteristics and on adjusting and aligning procedures.

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General FC <i>Skill Area</i>	<b>Electrical/Electronic Maintenance</b>
A <i>skill</i> you are expected to perform from the General Skill Area above:	<b>Perform test equipment pre-operational checks</b>
<i>Knowledge</i> you should have to perform this skill:	<ul style="list-style-type: none"><li>• Familiarity with test equipment</li></ul>
<i>References</i> you should study to gain the knowledge you need to perform this skill:	<ul style="list-style-type: none"><li>• <i>Introduction to Test Equipment</i>, NAVEDTRA B72-16-00-96; (NEETS MOD 16)</li></ul>
<i>Exam Expectations.</i> These are subject areas you should know to help you answer exam questions correctly:	You can expect questions on performing test equipment pre-operational checks.

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General FC <i>Skill Area</i>	<b>Electrical/Electronic Maintenance</b>
A <i>skill</i> you are expected to perform from the General Skill Area above:	<b>Replace faulty circuit components and subassemblies</b>
<i>Knowledge</i> you should have to perform this skill:	<ul style="list-style-type: none"> <li>• Procedures for removing and replacing electronic components and subassemblies</li> <li>• Special tools</li> <li>• How to select and use test equipment</li> <li>• Replace ESDS components</li> <li>• Identify ESDS circuits</li> </ul>
<i>References</i> you should study to gain the knowledge you need to perform this skill:	<ul style="list-style-type: none"> <li>• <i>Navy Installation and Maintenance Book (NIMB) Standard Maintenance Practices Miniature/Microminiature (2M) Electronic Assembly Repair</i>; NAVSEA SE000-01-IMB-010</li> <li>• <i>Navy Installation and Maintenance Book (NIMB) Installation Standards</i>; NAVSEA SE000-01-IMB-010</li> <li>• <i>Introduction to Microelectronics</i>; NAVEDTRA 172-14-00-84; (NEETS MOD 14)</li> <li>• <i>Standard Requirements for Soldered Electrical and Electronic Assembly</i>, MIL-STD 2000</li> </ul>
<i>Exam Expectations.</i> These are subject areas you should know to help you answer exam questions correctly:	You can expect questions on removing and replacing components, and subassemblies.

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General FC <i>Skill Area</i>	<b>Electrical/Electronic Maintenance</b>
A <i>skill</i> you are expected to perform from the General Skill Area above:	<b>Package electrostatic static discharge sensitive (ESDS) components</b>
<i>Knowledge</i> you should have to perform this skill:	How to: <ul style="list-style-type: none"> <li>• Package ESDS components</li> <li>• Label ESDS components</li> </ul>
<i>References</i> you should study to gain the knowledge you need to perform this skill:	<ul style="list-style-type: none"> <li>• <i>Ship Configuration and Logistics Support Information System</i>, TECH SPEC 9090-700A, NAVSEA S0752-AA-SPN-010 (SCLISIS)</li> </ul>
<i>Exam Expectations.</i> These are subject areas you should know to help you answer exam questions correctly:	You can expect questions on packaging and labeling ESDS components.

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General FC <i>Skill Area</i>	<b>Electrical/Electronic Maintenance</b>
A <i>skill</i> you are expected to perform from the General Skill Area above:	<b>Inspect, test, and maintain circuit card assemblies (CCAs)</b>
<i>Knowledge</i> you should have to perform this skill:	<ul style="list-style-type: none"> <li>• Procedures for removing, testing, and replacing CCA and components</li> <li>• Procedures for treating removing CCA corrosion problems</li> <li>• Inspecting for damage (Heat, cold, &amp; solder joint corrosion)</li> </ul>
<i>References</i> you should study to gain the knowledge you need to perform this skill:	<ul style="list-style-type: none"> <li>• <i>Navy Installation and Maintenance Book (NIMB) Standard Maintenance Practices Miniature/Microminiature (2M) Electronic Assembly Repair</i>; NAVSEA SE000-01-IMB-010</li> <li>• <i>Tests Methods and Practices</i>; NAVEDTRA B72-21-00-87; (NEETS MOD 21)</li> <li>• <i>Standard Requirements for Soldered Electrical and Electronic Assembly</i>, MIL-STD 2000</li> </ul>
<i>Exam Expectations.</i> These are subject areas you should know to help you answer exam questions correctly:	You can expect questions on troubleshooting and correcting CCA problems.

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General FC <i>Skill Area</i>	<b>Electrical/Electronic Maintenance</b>
A <i>skill</i> you are expected to perform from the General Skill Area above:	<b>Conduct acceptance tests on repaired electronic circuits and subassemblies</b>
<i>Knowledge</i> you should have to perform this skill:	How to: <ul style="list-style-type: none"> <li>• Test electronic circuits/subassemblies</li> <li>• Inspect electronic circuits/subassemblies</li> </ul>
<i>References</i> you should study to gain the knowledge you need to perform this skill:	<ul style="list-style-type: none"> <li>• <i>Navy Installation and Maintenance Book (NIMB) Standard Maintenance Practices Miniature/Microminiature (2M) Electronic Assembly Repair</i>, NAVSEA SE000-01-IMB-010</li> <li>• <i>Introduction to Wave-Propagation, Transmission Lines, and Antennas</i>, NAVEDTRA B72-10-00-93; (NEETS MOD 10 CH2)</li> <li>• <i>Radio-Frequency Communications Principles</i>, NAVEDTRA 172-17-00-84; (NEETS MOD 17 CH3)</li> <li>• <i>Standard Requirements for Soldered Electrical and Electronic Assembly</i>, MIL-STD 2000</li> </ul>
<i>Exam Expectations.</i> These are subject areas you should know to help you answer exam questions correctly:	You can expect questions on conducting acceptance tests on repaired electronic circuits and subassemblies.

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General FC <i>Skill Area</i>	<b>Electrical/Electronic Maintenance</b>
A <i>skill</i> you are expected to perform from the General Skill Area above:	<b>Test, Inspect and maintain ribbon cables, coaxial cables, and cable connectors</b>
<i>Knowledge</i> you should have to perform this skill:	<ul style="list-style-type: none"> <li>• Acceptable and unacceptable physical characteristics of cables and cable connectors</li> <li>• How to:</li> <li>• Inspect, test, troubleshoot, weather proof, and repair cables and cable connectors</li> </ul>
<i>References</i> you should study to gain the knowledge you need to perform this skill:	<ul style="list-style-type: none"> <li>• <i>Industrial Electromagnetic Compatibility Work Process Instructions</i>, NAVSEA STD 407-5287561 REV B</li> <li>• <i>Shipboard Bonding, Grounding, and Other Techniques for Electromagnetic Compatibility and Safety</i>, MIL-STD 1310</li> <li>• <i>Navy Installation and Maintenance Book (NIMB) Installation Standards</i>, NAVSEA SE000-01-IMB-010</li> <li>• <i>The Technician's Handbook</i>, NAVEDTRA B72-19-00-92; (NEETS MOD 19)</li> <li>• NSTM Chapter 408; <i>Fiber Optic Topology, Operation, Maintenance, and Repair</i>, NAVSEA S9086-PF-STM-010</li> <li>• <i>Fiber Optic Topology Installation Standard Methods for Naval Ships</i>, MIL-STD 2042A (SH)</li> <li>• <i>Introduction to Electrical Conductors, Wiring Techniques, and Schematic Reading</i>, NAVEDTRA B72-04-00-92; (NEETS MOD 4)</li> <li>• <i>Introduction to Fiber Optics</i>, NAVETRA B72-24-00-92; (NEETS MOD 24)</li> <li>• <i>Cable and Connector Repair</i>, NAVSEA OD 45879</li> </ul>

<i>Exam Expectations.</i> These are subject areas you should know to help you answer exam questions correctly:	You can expect questions on inspecting and repairing ribbon cables, coaxial cables, and cable connectors.
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General FC <i>Skill Area</i>	<b>Electrical/Electronic Maintenance</b>
A <i>skill</i> you are expected to perform from the General Skill Area above:	<b>Maintain low/high voltage power supplies</b>
<i>Knowledge</i> you should have to perform this skill:	<p>How to perform the following tasks on low/high voltage power supplies:</p> <ul style="list-style-type: none"> <li>• Perform functional checks</li> <li>• Adjust</li> <li>• Troubleshoot and repair</li> <li>• Replace components</li> </ul>
<i>References</i> you should study to gain the knowledge you need to perform this skill:	<ul style="list-style-type: none"> <li>• <i>Introduction to Electronic Emission, Tubes, and Power Supplies</i>, NAVEDTRA B72-06-00-92; (NEETS MOD 6 CH 3)</li> </ul>
<i>Exam Expectations.</i> These are subject areas you should know to help you answer exam questions correctly:	You can expect questions on the various aspects of maintaining EMI protection circuits.

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General FC <i>Skill Area</i>	<b>Electrical/Electronic Maintenance</b>
A <i>skill</i> you are expected to perform from the General Skill Area above:	<b>Maintain EMI protection circuits</b>
<i>Knowledge</i> you should have to perform this skill:	<p>How to perform the following tasks on EMI protection circuits:</p> <ul style="list-style-type: none"> <li>• Clean, inspect, and test</li> <li>• Troubleshoot</li> <li>• Replace EMI protection circuits</li> </ul>
<i>References</i> you should study to gain the knowledge you need to perform this skill:	<ul style="list-style-type: none"> <li>• <i>Navy Installation and Maintenance Book (NIMB) Installation Standards</i>, NAVSEA SE000-01-IMB-010</li> <li>• <i>Introduction to Electronic Emission, Tubes, and Power Supplies</i>, NAVEDTRA B72-06-00-92; (NEETS MOD 6 CH 3)</li> <li>• <i>Introduction to Wave-Propagation, Transmission Lines, and Antennas</i>, NAVEDTRA B72-10-00-93; (NEETS MOD 10 CH 2)</li> <li>• <i>Radio-Frequency Communications Principles</i>, NAVEDTRA 172-17-00-84; (NEETS MOD 17 CH 3)</li> <li>• <i>Electromagnetic Compatibility Criteria for Surface weapon Systems</i>, NAVSEA E9407-AA-SUP-010</li> </ul>
<i>Exam Expectations.</i> These are subject areas you should know to help you answer exam questions correctly:	You can expect questions on the various aspects of maintaining EMI protection circuits.

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General FC <i>Skill Area</i>	<b>Electrical/Electronic Maintenance</b>
A <i>skill</i> you are expected to perform from the General Skill Area above:	<b>Maintain video monitors</b>
<i>Knowledge</i> you should have to perform this skill:	<p>How to perform the following tasks on video monitors:</p> <ul style="list-style-type: none"> <li>• Perform functional checks</li> <li>• Clean, inspect, adjust, and align</li> <li>• Troubleshoot and repair</li> </ul>
<i>References</i> you should study to gain the knowledge you need to perform this skill:	<ul style="list-style-type: none"> <li>• <i>Introduction to Electronic Emission, Tubes, and Power Supplies</i>, NAVEDTRA B72-06-00-92; (NEETS MOD 6 CH 3)</li> <li>• <i>Display Systems and Devices</i>, NAVETRA 12407 CH 2 &amp; 4</li> <li>• UYQ-21 equipment manuals NAVSEA SE685-AF-MMM-(XXX)series</li> <li>• UYQ-4 equipment manuals; NAVSEA SE686-BV-MMO-(XXX)series</li> </ul>
<i>Exam Expectations.</i> These are subject areas you should know to help you answer exam questions correctly:	You can expect questions on the various aspects of maintaining video monitors.

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General FC <i>Skill Area</i>	<b>Electrical/Electronic Maintenance</b>
A <i>skill</i> you are expected to perform from the General Skill Area above:	<b>Identify and tag out multiple power source equipment</b>
<i>Knowledge</i> you should have to perform this skill:	How to: <ul style="list-style-type: none"> <li>Identify and tag out multiple power sources</li> </ul>
<i>References</i> you should study to gain the knowledge you need to perform this skill:	<ul style="list-style-type: none"> <li>CSOSS Books 31.1, 31.2, 31.3, 31.4, and 31.5</li> <li><i>Navy Occupational Safety and Health Program Manual for Forces Afloat</i>, OPNAVINST 5100.19C CH B11 Vol. 1</li> <li><i>Standard Organization and Regulation Manual (SORM)</i> , OPNAVINST 3120.32C CH 630.17</li> <li><i>Standard Dictionary of Electrical and Electronic Terms</i>, ANSI/IEEE STD 100-1988</li> </ul>
<i>Exam Expectations.</i> These are subject areas you should know to help you answer exam questions correctly:	You can expect questions on identifying multiple power source equipment from schematics and on performing tag out procedures on that equipment.

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General FC <i>Skill Area</i>	<b>Electrical/Electronic Maintenance</b>
A <i>skill</i> you are expected to perform from the General Skill Area above:	<b>Discharge electrolytic components and CRTs</b>
<i>Knowledge</i> you should have to perform this skill:	<ul style="list-style-type: none"> <li>• High-voltage safety requirements and procedures</li> <li>• Procedures for discharging electrolytic components and CRTs</li> <li>• Replace CRT</li> </ul>
<i>References</i> you should study to gain the knowledge you need to perform this skill:	<ul style="list-style-type: none"> <li>• <i>Navy Installation and Maintenance Book (NIMB) Installation Standards</i>, NAVSEA SE000-01-IMB-010</li> <li>• <i>Introduction to Alternating Current and Transformers</i>, NAVEDTRA 172-02-00-91; (NEETS MOD 2)</li> <li>• <i>Introduction to Test Equipment</i>, NAVEDTRA B72-16-00-96 NEETS MOD 16</li> </ul>
<i>Exam Expectations.</i> These are subject areas you should know to help you answer exam questions correctly:	You can expect questions on requirements and procedures for discharging electrolytic components and CRTs.

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General FC <i>Skill Area</i>	<b>Electrical/Electronic Maintenance</b>
A <i>skill</i> you are expected to perform from the General Skill Area above:	<b>Dispose of CRTs</b>
<i>Knowledge</i> you should have to perform this skill:	<ul style="list-style-type: none"> <li>• Safety issues associated with CRTs</li> <li>• Procedures for disposing of CRTs</li> </ul>
<i>References</i> you should study to gain the knowledge you need to perform this skill:	<ul style="list-style-type: none"> <li>• NSTM Chapter 670; <i>Stowage, Handling, and Disposal of Hazard General Use Consumables</i>; NAVSEA S9086-WK-STM-010</li> <li>• <i>Navy Occupational Safety and Health Program Manual for Forces Afloat</i>; OPNAVINST 5100.19C Vol. 1</li> <li>• Ship's instructions</li> </ul>
<i>Exam Expectations.</i> These are subject areas you should know to help you answer exam questions correctly:	You can expect questions on the safe handling and disposal of CRTs.

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General FC <i>Skill Area</i>	<b>Electrical/Electronic Maintenance</b>
A <i>skill</i> you are expected to perform from the General Skill Area above:	<b>Conduct tests for grounding straps</b>
<i>Knowledge</i> you should have to perform this skill:	<p>How to:</p> <ul style="list-style-type: none"> <li>• Inspect grounding straps</li> <li>• Conduct tests for grounding straps</li> <li>• Replace grounding straps</li> </ul>
<i>References</i> you should study to gain the knowledge you need to perform this skill:	<ul style="list-style-type: none"> <li>• <i>Introduction to Test Equipment</i>, NAVEDTRA B72-16-00-96; (NEETS MOD 16)</li> <li>• <i>Navy Installation and Maintenance Book (NIMB) Installation Standards</i>, NAVSEA SE000-01-IMB-010</li> <li>• <i>Shipboard Bonding, Grounding, and Other Techniques for Electromagnetic Compatibility and Safety</i>, MIL-STD 1310</li> </ul>
<i>Exam Expectations.</i> These are subject areas you should know to help you answer exam questions correctly:	You can expect questions on conducting inspections, tests, and replacing grounding straps.

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General FC <i>Skill Area</i>	<b>Electrical/ Electronic Maintenance</b>
A <i>skill</i> you are expected to perform from the General Skill Area above:	<b>Place equipment into a Hazard from Electromagnetic Radiation to Ordnance (HERO), Hazard of Electromagnetic Radiation to Fuel (HERF), and Hazard from Electromagnetic Radiation to Personnel (HERP) condition</b>
<i>Knowledge</i> you should have to perform this skill:	<ul style="list-style-type: none"> <li>• Effects of electromagnetic radiation on various shipboard ordnance, fuels, and personnel</li> <li>• How to place fire-control equipment into a HERF, HERO, and HERP condition</li> </ul>
<i>References</i> you should study to gain the knowledge you need to perform this skill:	<ul style="list-style-type: none"> <li>• Ship's instruction "<i>Emission Control Bill</i>"</li> <li>• <i>Electromagnetic Radiation Hazards</i>; NAVSEA OP 3565</li> </ul>
<i>Exam Expectations.</i> These are subject areas you should know to help you answer exam questions correctly:	You can expect questions on placing fire-control equipment into a HERF condition.

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General FC <i>Skill Area</i>	<b>Electrical/Electronic Maintenance</b>
A <i>skill</i> you are expected to perform from the General Skill Area above:	<b>Inventory MAMS and RSS</b>
<i>Knowledge</i> you should have to perform this skill:	<ul style="list-style-type: none"> <li>Requirements and procedures for inventorying MAMS &amp; RSS</li> </ul>
<i>References</i> you should study to gain the knowledge you need to perform this skill:	<ul style="list-style-type: none"> <li><i>Ship Configuration and Logistics Support Information System</i>, TECH SPEC 9090-700A, NAVSEA S0752-AA-SPN-010 (SCLISIS)</li> </ul>
<i>Exam Expectations.</i> These are subject areas you should know to help you answer exam questions correctly:	You can expect questions on inventorying MAMS and RSS.

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General FC <i>Skill Area</i>	<b>Electrical/Electronic Maintenance</b>
A <i>skill</i> you are expected to perform from the General Skill Area above:	<b>Perform basic soldering</b>
<i>Knowledge</i> you should have to perform this skill:	How to: <ul style="list-style-type: none"> <li>• Perform basic soldering</li> </ul>
<i>References</i> you should study to gain the knowledge you need to perform this skill:	<ul style="list-style-type: none"> <li>• <i>Navy Installation and Maintenance Book (NIMB) Standard Maintenance Practices Miniature/Microminiature (2M) Electronic Assembly Repair</i>; NAVSEA SE000-01-IMB-010</li> <li>• <i>Tests Methods and Practices</i>; NAVEDTRA B72-21-00-87; (NEETS MOD 21)</li> <li>• <i>Standard Requirements for Soldered Electrical and Electronic Assembly</i>, MIL-STD 2000</li> </ul>
<i>Exam Expectations.</i> These are subject areas you should know to help you answer exam questions correctly:	You can expect questions on performing basic soldering.

## Advancement Handbook for FC3

General FC <i>Skill Area</i>	<b>Electronic Support Equipment</b>
A <i>skill</i> you are expected to perform from the General Skill Area above:	<b>Maintain Electronic Equipment Liquid Cooling Systems (EELCS)</b>
<i>Knowledge</i> you should have to perform this skill:	<p>How to:</p> <ul style="list-style-type: none"> <li>• Monitor EELCS operations</li> <li>• Perform preventive maintenance on EELCS components</li> <li>• Perform corrective maintenance on EELCS components</li> <li>• Maintain /troubleshoot EELCS alarms</li> <li>• Align components</li> </ul>
<i>References</i> you should study to gain the knowledge you need to perform this skill:	<ul style="list-style-type: none"> <li>• <i>Demineralizer/Water Cooler HD-1077</i>; NAVSEA S9536-AJ-AEG-010</li> <li>• <i>Electronic Equipment Water Cooler HD-1140</i>; NAVSEA SW279-CL-AEG-010</li> <li>• <i>Basic Liquid Cooling Systems for Shipboard Electronics</i>; NAVSEA 0948-LP-122-8010</li> <li>• NSTM Chapter 532; <i>Liquid Cooling Systems for Electronic Equipment</i>; NAVSEA S9086-SD-STM-010 CH 532</li> <li>• MIP 5321/R51-19, 5321/R51-29, 4560/R08-29 or associated MIP</li> </ul>
<i>Exam Expectations.</i> These are subject areas you should know to help you answer exam questions correctly:	You can expect questions on monitoring EELCS operations and on maintaining EELCS and system alarms.

## Advancement Handbook for FC3

General FC <i>Skill Area</i>	<b>Electronic Support Equipment</b>
A <i>skill</i> you are expected to perform from the General Skill Area above:	<b>Clean and inspect sea strainers</b>
<i>Knowledge</i> you should have to perform this skill:	<ul style="list-style-type: none"> <li>• Procedures for cleaning sea strainers</li> <li>• Sea strainer inspection requirements and procedures</li> </ul>
<i>References</i> you should study to gain the knowledge you need to perform this skill:	<ul style="list-style-type: none"> <li>• NSTM Chapter 532; <i>Liquid Cooling Systems for Electronic Equipment</i>; NAVSEA S9086-SD-STM-010</li> <li>• MIP 5321/R51-19, 4560/R08-29 or associated MIP</li> </ul>
<i>Exam Expectations.</i> These are subject areas you should know to help you answer exam questions correctly:	You can expect questions concerning the cleaning and inspection of sea strainers.

## Advancement Handbook for FC3

General FC <i>Skill Area</i>	<b>Electronic Support Equipment</b>
A <i>skill</i> you are expected to perform from the General Skill Area above:	<b>Maintain heat exchangers</b>
<i>Knowledge</i> you should have to perform this skill:	How to: <ul style="list-style-type: none"> <li>• Back flush heat exchangers</li> <li>• Replace heat exchangers and heat exchanger components</li> </ul>
<i>References</i> you should study to gain the knowledge you need to perform this skill:	<ul style="list-style-type: none"> <li>• NSTM Chapter 532; <i>Liquid Cooling Systems for Electronic Equipment</i>; NAVSEA S9086-SD-STM-010</li> <li>• MIP 5321/R51-19, 4560/R08-29 or associated MIP</li> </ul>
<i>Exam Expectations.</i> These are subject areas you should know to help you answer exam questions correctly:	You can expect questions on actions required to maintain heat exchangers.

## Advancement Handbook for FC3

General FC <i>Skill Area</i>	<b>Electronic Support Equipment</b>
A <i>skill</i> you are expected to perform from the General Skill Area above:	<b>Maintain humidity and temperature recorders</b>
<i>Knowledge</i> you should have to perform this skill:	<p>How to:</p> <ul style="list-style-type: none"> <li>• Perform functional checks on humidity and temperature recorders</li> <li>• Clean, adjust, and inspect humidity and temperature recorders</li> <li>• Replace humidity and temperature recorder components</li> </ul>
<i>References</i> you should study to gain the knowledge you need to perform this skill:	<ul style="list-style-type: none"> <li>• <i>Operation and Maintenance, Electronic Humidity &amp; Temperature Recorder</i>; NAVSEA 0387-LP-050-4000</li> <li>• <i>NSTM 504; Pressure, Temperature, and Other Mechanical and Electromechanical Measuring Instruments</i>; NAVSEA S9086-RJ-STM-000</li> </ul>
<i>Exam Expectations.</i> These are subject areas you should know to help you answer exam questions correctly:	You can expect questions on maintaining humidity and temperature recorders, as well as questions concerning their characteristics and operation.

## Advancement Handbook for FC3

General FC <i>Skill Area</i>	<b>Electronic Support Equipment</b>
A <i>skill</i> you are expected to perform from the General Skill Area above:	<b>Maintain electronic frequency converters</b>
<i>Knowledge</i> you should have to perform this skill:	<p>How to:</p> <ul style="list-style-type: none"> <li>• Perform functional checks</li> <li>• Monitor (current, voltage, and frequency)</li> <li>• Clean/inspect</li> <li>• Adjust and align</li> <li>• Troubleshoot</li> <li>• Replace components</li> </ul>
<i>References</i> you should study to gain the knowledge you need to perform this skill:	<ul style="list-style-type: none"> <li>• NSTM Chapter 320; <i>Electric Power Distribution Systems</i>; NAVSEA S9086-KY-STM-010</li> <li>• NSTM Chapter 310; <i>Electric Power Generators and Conversion</i>; NAVSEA S9086-KN-STM-010</li> <li>• NSTM Chapter 400; <i>Electronics</i>; NAVSEA S9086-ND-STM-000</li> <li>• NSTM Chapter 491; <i>Electrical Measuring and Test Instruments</i>; NAVSEA S9086-Q5-STM-000</li> <li>• <i>Frequency Static Converter Group MK 84 MOD 1</i>; NAVSEA S9314-A4-MMA-010</li> <li>• MIP 3140/R51-39 or associated MIP</li> </ul>
<i>Exam Expectations.</i> These are subject areas you should know to help you answer exam questions correctly:	You can expect questions on monitoring and performing preventive maintenance on electronic frequency converters.

## Advancement Handbook for FC3

General FC <i>Skill Area</i>	<b>Electronic Support Equipment</b>
A <i>skill</i> you are expected to perform from the General Skill Area above:	<b>Monitor dry air systems</b>
<i>Knowledge</i> you should have to perform this skill:	<p>How to:</p> <ul style="list-style-type: none"> <li>• Perform functional checks.</li> <li>• Monitor system control panels.</li> <li>• Purge the system</li> </ul>
<i>References</i> you should study to gain the knowledge you need to perform this skill:	<ul style="list-style-type: none"> <li>• <i>Dehydrator, Low Pressure Air, Desiccant Type Electronic Dry Air System, Type II</i>; NAVSEA S9514-B9-MMM-010</li> <li>• <i>FFG Electronic Dry Air</i>; NAVSEA S9514-B9-MMM-010</li> <li>• NSTM Chapter 551; <i>Compressed Air Plants and Systems</i>; NAVSEA S9086-SY-STM-010</li> <li>• MIP 5513/017-49, 4560/R08-29 or associated MIP</li> </ul>
<i>Exam Expectations.</i> These are subject areas you should know to help you answer exam questions correctly:	You can expect questions on monitoring and purging dry air systems.

## Advancement Handbook for FC3

General FC <i>Skill Area</i>	<b>Electronic Support Equipment</b>
A <i>skill</i> you are expected to perform from the General Skill Area above:	<b>Maintain dehydrators</b>
<i>Knowledge</i> you should have to perform this skill:	How to perform the following tasks on dehydrators: <ul style="list-style-type: none"> <li>• Adjust</li> <li>• Replace components</li> <li>• Clean and Inspect</li> </ul>
<i>References</i> you should study to gain the knowledge you need to perform this skill:	<ul style="list-style-type: none"> <li>• <i>Auxiliary Equipment Group</i>; NAVSEA SW279-CL-AEG-010</li> </ul>
<i>Exam Expectations.</i> These are subject areas you should know to help you answer exam questions correctly:	You can expect questions on all aspects of maintaining dehydrators.

## Advancement Handbook for FC3

General FC <i>Skill Area</i>	<b>Electronic Support Equipment</b>
A <i>skill</i> you are expected to perform from the General Skill Area above:	<b>Replace compressed air bottles</b>
<i>Knowledge</i> you should have to perform this skill:	<ul style="list-style-type: none"> <li>• Safety rules and requirements associated with handling compressed gasses</li> <li>• Procedures for storing, moving, and connecting compressed gas bottles</li> </ul>
<i>References</i> you should study to gain the knowledge you need to perform this skill:	<ul style="list-style-type: none"> <li>• <i>Navy Occupational Safety and Health Program Manual for Forces Afloat</i>; OPNAVINST 5100.19C CH C23 Vol. 1</li> <li>• MIP 6630/005-B8 or associated MIP</li> </ul>
<i>Exam Expectations.</i> These are subject areas you should know to help you answer exam questions correctly:	You can expect questions on storing, handling, and connecting compressed gas bottles.

## Advancement Handbook for FC3

General FC <i>Skill Area</i>	<b>Electronic Support Equipment</b>
A <i>skill</i> you are expected to perform from the General Skill Area above:	<b>Maintain waveguide assemblies</b>
<i>Knowledge</i> you should have to perform this skill:	How to: <ul style="list-style-type: none"><li>• Clean and inspect waveguides</li><li>• Replace waveguides</li></ul>
<i>References</i> you should study to gain the knowledge you need to perform this skill:	<ul style="list-style-type: none"><li>• <i>Navy Installation and Maintenance Book (NIMB) Installation Standards</i>; NAVSEA SE000-01-IMB-010, Section 5</li></ul>
<i>Exam Expectations.</i> These are subject areas you should know to help you answer exam questions correctly:	You can expect questions on basic waveguide assembly maintenance.

## Advancement Handbook for FC3

General FC <i>Skill Area</i>	<b>Electronic Support Equipment</b>
<i>A skill</i> you are expected to perform from the General Skill Area above:	<b>Maintain power control devices</b>
<i>Knowledge</i> you should have to perform this skill:	<p>How to:</p> <ul style="list-style-type: none"> <li>• Perform functional checks</li> <li>• Troubleshoot</li> <li>• Replace components</li> </ul>
<i>References</i> you should study to gain the knowledge you need to perform this skill:	<ul style="list-style-type: none"> <li>• NSTM Chapter 320; <i>Electric Power Distribution Systems</i>; NAVSEA S9086-KY-STM-010</li> <li>• NSTM Chapter 310; <i>Electric Power Generators and Conversion</i>; NAVSEA S9086-KN-STM-010</li> <li>• NSTM Chapter 400; <i>Electronics</i>; NAVSEA S9086-ND-STM-000</li> <li>• NSTM Chapter 491; <i>Electrical Measuring and Test Instruments</i>; NAVSEA S9086-Q5-STM-000</li> <li>• <i>Introduction to Generators and Motors</i>, NAVEDTRA B72-05-00-94; (NEETS MOD 5)</li> <li>• MIP 3140/R51-39 or associated MIP</li> </ul>
<i>Exam Expectations.</i> These are subject areas you should know to help you answer exam questions correctly:	You can expect questions on maintaining power control devices.

## Advancement Handbook for FC3

General FC <i>Skill Area</i>	<b>Electronic Support Equipment</b>
A <i>skill</i> you are expected to perform from the General Skill Area above:	<b>Verify the calibration of test equipment</b>
<i>Knowledge</i> you should have to perform this skill:	How to: <ul style="list-style-type: none"> <li>• Verify the calibration of test equipment</li> </ul>
<i>References</i> you should study to gain the knowledge you need to perform this skill:	<ul style="list-style-type: none"> <li>• <i>Introduction to Test Equipment</i>; NAVEDTRA B72-16-00-96; (NEETS VOL 16)</li> <li>• <i>METRL Automated System for Uniform Recall and Reporting</i>; NAVSEA 0420-LP-182-8700</li> </ul>
<i>Exam Expectations.</i> These are subject areas you should know to help you answer exam questions correctly:	You can expect questions on verifying the calibration of test equipment.

## Advancement Handbook for FC3

General FC <i>Skill Area</i>	<b>Electronic Casualty Control</b>
A <i>skill</i> you are expected to perform from the General Skill Area above:	<b>Perform alternate bus transfers</b>
<i>Knowledge</i> you should have to perform this skill:	How to: <ul style="list-style-type: none"> <li>• Perform alternate bus transfers</li> <li>• Place equipment in a casualty mode</li> </ul>
<i>References</i> you should study to gain the knowledge you need to perform this skill:	<ul style="list-style-type: none"> <li>• CSOSS Book 1 series</li> <li>• CSOSS Book 18 series</li> <li>• CSOSS Book 31 series</li> </ul>
<i>Exam Expectations.</i> These are subject areas you should know to help you answer exam questions correctly:	You can expect questions on performing alternate bus transfers and placing equipment in a casualty mode.

## Advancement Handbook for FC3

General FC <i>Skill Area</i>	<b>Electronic Casualty Control</b>
A <i>skill</i> you are expected to perform from the General Skill Area above:	<b>Align equipment cooling systems (normal and casualty modes)</b>
<i>Knowledge</i> you should have to perform this skill:	<ul style="list-style-type: none"> <li>• Requirements for aligning and realigning equipment cooling systems</li> <li>• Procedures for aligning and realigning equipment cooling systems</li> </ul>
<i>References</i> you should study to gain the knowledge you need to perform this skill:	<ul style="list-style-type: none"> <li>• NSTM Chapter 532; <i>Liquid Cooling Systems for Electronic Equipment</i>; NAVSEA S9086-SD-STM-010 CH 532</li> <li>• <i>Combat System Operational Sequencing System</i>, (CSOSS), Book 1.1</li> </ul>
<i>Exam Expectations.</i> These are subject areas you should know to help you answer exam questions correctly:	You can expect questions on situations that might require aligning or realigning equipment cooling systems.

## Advancement Handbook for FC3

General FC <i>Skill Area</i>	<b>Electronic Casualty Control</b>
A <i>skill</i> you are expected to perform from the General Skill Area above:	<b>Place equipment in the casualty mode</b>
<i>Knowledge</i> you should have to perform this skill:	<ul style="list-style-type: none"> <li>• Chain of command requirements and reporting procedures for placing equipment in a battle short or casualty mode</li> <li>• Procedures for placing equipment in a battle short or casualty mode</li> </ul>
<i>References</i> you should study to gain the knowledge you need to perform this skill:	<ul style="list-style-type: none"> <li>• NSTM Chapter 532; <i>Liquid Cooling Systems for Electronic Equipment</i>; NAVSEA S9086-SD-STM-010 CH 532</li> <li>• CSOSS Book 1.1</li> </ul>
<i>Exam Expectations.</i> These are subject areas you should know to help you answer exam questions correctly:	You can expect questions on supervisory requirements and technician reporting requirements associated with placing equipment in battle short or casualty mode. Also physical procedures for placing equipment in battle short or casualty mode.

## Advancement Handbook for FC3

General FC <i>Skill Area</i>	<b>Electronic Casualty Control</b>
A <i>skill</i> you are expected to perform from the General Skill Area above:	<b>Set up equipment for a specified EMCON condition</b>
<i>Knowledge</i> you should have to perform this skill:	<ul style="list-style-type: none"> <li>• Place equipment in required EMCON condition</li> <li>• Procedure for verifying and monitoring equipment status in each EMCON condition</li> </ul>
<i>References</i> you should study to gain the knowledge you need to perform this skill:	<ul style="list-style-type: none"> <li>• Ship's EMCON bill</li> </ul>
<i>Exam Expectations.</i> These are subject areas you should know to help you answer exam questions correctly:	You can expect questions on the status of equipment for various EMCON conditions and on verifying the status of equipment under various EMCON conditions.

## Advancement Handbook for FC3

General FC <i>Skill Area</i>	<b>Electronic Casualty Control</b>
A <i>skill</i> you are expected to perform from the General Skill Area above:	<b>Monitor EMCON compliance</b>
<i>Knowledge</i> you should have to perform this skill:	<ul style="list-style-type: none"> <li>Requirements of the various EMCON levels</li> </ul> <p>How to:</p> <ul style="list-style-type: none"> <li>Monitor compliance with EMCON requirements</li> <li>Operate radiating equipment in accordance with the ship's EMCON plan</li> <li>Report the operation of radiating equipment</li> </ul>
<i>References</i> you should study to gain the knowledge you need to perform this skill:	<ul style="list-style-type: none"> <li>Ship's instruction "<i>Emission Control Bill</i>"</li> <li><i>Class Combat System Doctrine</i>, COMNAVSURFLANT/COMNAVSURFPAC INST C3516 Series</li> <li>Ship's battle doctrine</li> </ul>
<i>Exam Expectations.</i> These are subject areas you should know to help you answer exam questions correctly:	You can expect questions on operating and coordinating the operation of fire-control radiating equipment, and in reporting such operations in accordance with the ship's Emission Control Bill.

## Advancement Handbook for FC3

General FC <i>Skill Area</i>	<b>Electronic Hazardous Material Control</b>
A <i>skill</i> you are expected to perform from the General Skill Area above:	<b>Review HMUG, HAZMAT inventories, and Material Safety Data Sheets (MSDS)</b>
<i>Knowledge</i> you should have to perform this skill:	Contents of and requirements for reviewing: <ul style="list-style-type: none"> <li>• Hazardous Material User's Guide (HMUG)</li> <li>• HAZMAT inventories</li> <li>• MSDS</li> </ul>
<i>References</i> you should study to gain the knowledge you need to perform this skill:	<ul style="list-style-type: none"> <li>• NSTM Chapter 670; <i>Stowage, Handling, and Disposal of Hazardous General Use Consumables</i>; NAVSEA S9086-WK-STM-010</li> <li>• <i>Navy Occupational Safety and Health Program Manual for Forces Afloat</i>; OPNAVINST 5100.19 Vol. II; Ch. 23</li> <li>• <i>Navy Occupational Safety and Health Program Manual for Forces Afloat</i>; OPNAVINST 5100.19 Vol. I; Ch. 3</li> <li>• Ship's instructions</li> </ul>
<i>Exam Expectations.</i> These are subject areas you should know to help you answer exam questions correctly:	You can expect questions on the contents of and requirements for reviewing the HMUG, inventories of HAZMAT, and MSDS.

## Advancement Handbook for FC3

General FC <i>Skill Area</i>	<b>Electronic Hazardous Material Control</b>
A <i>skill</i> you are expected to perform from the General Skill Area above:	<b>Inspect and evaluate HAZMAT storage</b>
<i>Knowledge</i> you should have to perform this skill:	<ul style="list-style-type: none"> <li>• HAZMAT storage requirements (locations, methods, reports, etc.)</li> <li>• Storage area inspection requirements and procedures</li> </ul>
<i>References</i> you should study to gain the knowledge you need to perform this skill:	<ul style="list-style-type: none"> <li>• NSTM Chapter 670; <i>Stowage, Handling, and Disposal of Hazardous General Use Consumables</i>; NAVSEA S9086-WK-STM-010</li> <li>• <i>Navy Occupational Safety and Health Program Manual for Forces Afloat</i>; OPNAVINST 5100.19C, Ch C23</li> <li>• Ship's instructions</li> </ul>
<i>Exam Expectations.</i> These are subject areas you should know to help you answer exam questions correctly:	You can expect questions on evaluating the storage of HAZMAT and on associated reports.

## Advancement Handbook for FC3

General FC <i>Skill Area</i>	<b>Electronic Hazardous Material Control</b>
A <i>skill</i> you are expected to perform from the General Skill Area above:	<b>Implement HAZMAT waste disposal methods</b>
<i>Knowledge</i> you should have to perform this skill:	<ul style="list-style-type: none"> <li>• Methods for disposing of various types of HAZMAT</li> <li>• Procedures for cleaning and inspecting HAZMAT containers</li> </ul>
<i>References</i> you should study to gain the knowledge you need to perform this skill:	<ul style="list-style-type: none"> <li>• NSTM Chapter 670; <i>Stowage, Handling, and Disposal of Hazardous General Use Consumables</i>; NAVSEA S9086-WK-STM-010</li> <li>• <i>Navy Occupational Safety and Health Program Manual for Forced Afloat</i>; OPNAVINST 5100.19 Vol. II; Ch. 23</li> <li>• <i>Navy Occupational Safety and Health Program Manual for Forced Afloat</i>; OPNAVINST 5100.19 Vol. I; Ch. 3</li> <li>• Ship's instructions</li> </ul>
<i>Exam Expectations.</i> These are subject areas you should know to help you answer exam questions correctly:	You can expect questions on various methods approved for disposing of HAZMAT, and the procedures for cleaning and inspecting HAZMAT containers.

## Advancement Handbook for FC3

General FC <i>Skill Area</i>	<b>Electronic Hazardous Material Control</b>
A <i>skill</i> you are expected to perform from the General Skill Area above:	<b>Maintain HAZMAT containers</b>
<i>Knowledge</i> you should have to perform this skill:	How to: Clean and inspect
<i>References</i> you should study to gain the knowledge you need to perform this skill:	<ul style="list-style-type: none"> <li>• <i>Navy Occupational Safety and Health Program Manual for Forced Afloat; OPNAVINST 5100.19 Vol. II; Ch. 23</i></li> <li>• <i>Navy Occupational Safety and Health Program Manual for Forced Afloat; OPNAVINST 5100.19 Vol. I; Ch. 3</i></li> <li>• Ship's instructions</li> </ul>
<i>Exam Expectations.</i> These are subject areas you should know to help you answer exam questions correctly:	You can expect questions on cleaning and inspecting of HAZMAT containers.

## Advancement Handbook for FC3

General FC <i>Skill Area</i>	<b>Computer and Peripheral Maintenance</b>
A <i>skill</i> you are expected to perform from the General Skill Area above:	<b>Configure the system for, monitor, and record the results of Daily System Operability Tests and Overall Combat System Operability Tests (DSOT/OCSOT)</b>
<i>Knowledge</i> you should have to perform this skill:	<p>How to:</p> <ul style="list-style-type: none"> <li>• Configure the system for DSOT</li> <li>• Configure the system for OCSOT</li> <li>• Monitor the system for DSOT/OCSOT</li> <li>• Record the results of DSOT/OCSOT</li> </ul>
<i>References</i> you should study to gain the knowledge you need to perform this skill:	<ul style="list-style-type: none"> <li>• <i>Operational Readiness Test System MK 7</i>; NAVSEA ST890-A3-AEG-010</li> <li>• CSOSS Book 30</li> <li>• CSOSS Book 24 series</li> <li>• <i>AEGIS Combat Trainer System Mk 29, Description, Operation , and Maintenance</i>; NAVSEA S8000-AB-AEG-010</li> <li>• <i>AEGIS Combat Trainer System (ACTS) Operator Operating Principles and Procedures</i>; NAVSEA S9410-AL-AEG-060</li> <li>• <i>User's Manual for AEGIS Tactical Executive System</i> (ATES/43); ACD 3106B</li> <li>• <i>User's Manual for AEGIS Tactical Utilities Function</i> (TUF); ACD 3296</li> <li>• MIP 8443/507-29, 8443/043-A4, 8443/040-39, or associated MIP</li> </ul>
<i>Exam Expectations.</i> These are subject areas you should know to help you answer exam questions correctly:	You can expect questions on configuring the system for, monitoring and recording the results of DSOT/OCSOT.

## Advancement Handbook for FC3

General FC <i>Skill Area</i>	<b>Computer and Peripheral Maintenance</b>
A <i>skill</i> you are expected to perform from the General Skill Area above:	<b>Load various Programmed Operational and Functional Appraisals (POFA) computer programs</b>
<i>Knowledge</i> you should have to perform this skill:	How to load the following types of programs: <ul style="list-style-type: none"> <li>• POFA</li> </ul>
<i>References</i> you should study to gain the knowledge you need to perform this skill:	<ul style="list-style-type: none"> <li>• CSOSS Books 1.1, 24.1, 31.1, and 46</li> <li>• <i>Operating Procedure for AN/UYK-43 TO AN/UYK-43 Intercomputer POFA</i>; NAVSEA 0967-LP-016-1570</li> <li>• <i>Operating Procedure for RD-358 Magnetic Tape Subsystem POFA</i>; NAVSEA 0967-LP-016-2020</li> <li>• <i>Operating Procedure for AN/UYH-3 Disk System POFA</i>; NAVSEA 0967-LP-016-2750</li> <li>• <i>Operating Procedure for the Xerox 72A Printer/Plotter W/Model 190C Controller</i>; NAVSEA 0967-LP-016-2780</li> <li>• MIP8443/001-B1 or associated MIP</li> </ul>
<i>Exam Expectations.</i> These are subject areas you should know to help you answer exam questions correctly:	You can expect questions on loading various POFA computer programs.

## Advancement Handbook for FC3

General FC <i>Skill Area</i>	<b>Computer and Peripheral Maintenance</b>
A <i>skill</i> you are expected to perform from the General Skill Area above:	<b>Load, monitor, record, and analyze the results of Maintenance Test Programs/Standard Test Programs (MTP/STP)</b>
<i>Knowledge</i> you should have to perform this skill:	How to: <ul style="list-style-type: none"> <li>• Load the program</li> <li>• Monitor the tests and record the results of the tests</li> <li>• Analyze the test results</li> </ul>
<i>References</i> you should study to gain the knowledge you need to perform this skill:	<ul style="list-style-type: none"> <li>• <i>Software/Documentation Index; Maintenance Software Support Center (MSSC), NAVSEA 0967-LP-011-0172</i></li> </ul>
<i>Exam Expectations.</i> These are subject areas you should know to help you answer exam questions correctly:	You can expect questions on MTP/STPs, from loading the programs through analyzing test results.

## Advancement Handbook for FC3

General FC <i>Skill Area</i>	<b>Computer and Peripheral Maintenance</b>
A <i>skill</i> you are expected to perform from the General Skill Area above:	<b>Load, monitor, record, and analyze the results of diagnostic programs</b>
<i>Knowledge</i> you should have to perform this skill:	<p>How to:</p> <ul style="list-style-type: none"> <li>• Load the program</li> <li>• Monitor the tests and record the results of the tests</li> <li>• Analyze the test results</li> </ul>
<i>References</i> you should study to gain the knowledge you need to perform this skill:	<ul style="list-style-type: none"> <li>• <i>Operational Readiness Test System MK 7; NAVSEA ST890-A3-AEG-010</i></li> <li>• <i>User's Manual for AEGIS Tactical Executive System (ATES/43); ACD 3106B</i></li> <li>• <i>User's Manual for AEGIS Tactical Utilities Function (TUF); ACD 3296</i></li> <li>• <i>Software/Documentation Index; Maintenance software Support Center (MSSC), NAVSEA 0967-LP-011-0172</i></li> </ul>
<i>Exam Expectations.</i> These are subject areas you should know to help you answer exam questions correctly:	You can expect questions on diagnostic tests, from loading the programs through analyzing test results.

## Advancement Handbook for FC3

General FC <i>Skill Area</i>	<b>Computer and Peripheral Maintenance</b>
A <i>skill</i> you are expected to perform from the General Skill Area above:	<b>Analyze interface operations</b>
<i>Knowledge</i> you should have to perform this skill:	<p>How to:</p> <ul style="list-style-type: none"> <li>• Evaluate interface operations</li> <li>• Diagnose system malfunctions</li> <li>• Diagnose system transfer errors</li> </ul>
<i>References</i> you should study to gain the knowledge you need to perform this skill:	<ul style="list-style-type: none"> <li>• <i>User's Manual for AEGIS Tactical Executive System</i> (ATES/43); ACD 3106B</li> <li>• <i>User's Manual for AEGIS Tactical Utilities Function</i> (TUF); ACD 3296</li> <li>• <i>AEGIS Combat System Configuration Definition Document</i>; CDRL J016</li> <li>• <i>AEGIS Post Mission Analysis</i>; NAVSEA S9410-AL-AEG-330</li> <li>• <i>Introduction to Digital Computers</i>; NAVEDTRA B72-22-00-88; (NEETS MOD 22)</li> <li>• CSTOM for your specific platform (i.e. NAVSEA S9CGO-BR-CSM-070 NAVSEA S9CGO-BR-CSM-080 NAVSEA S9CGO-BR-CSM-090 NAVSEA S9CGO-BR-CSM-100)</li> </ul>
<i>Exam Expectations.</i> These are subject areas you should know to help you answer exam questions correctly:	You can expect questions on diagnosing system computer problems.

## Advancement Handbook for FC3

General FC <i>Skill Area</i>	<b>Computer and Peripheral Maintenance</b>
A <i>skill</i> you are expected to perform from the General Skill Area above:	<b>Maintain video processors</b>
<i>Knowledge</i> you should have to perform this skill:	<p>How to perform the following tasks on video processors:</p> <ul style="list-style-type: none"> <li>• Perform functional checks</li> <li>• Clean and inspect</li> <li>• Adjust</li> <li>• Troubleshoot</li> <li>• Replace processor assemblies</li> </ul>
<i>References</i> you should study to gain the knowledge you need to perform this skill:	<ul style="list-style-type: none"> <li>• MIP 4111/020-29, 4911/501-49, 8442/002-48, or associated MIP</li> </ul>
<i>Exam Expectations.</i> These are subject areas you should know to help you answer exam questions correctly:	You can expect questions on all aspects of maintaining video processors.

## Advancement Handbook for FC3

General FC <i>Skill Area</i>	<b>Computer and Peripheral Maintenance</b>
A <i>skill</i> you are expected to perform from the General Skill Area above:	<b>Maintain system computers</b>
<i>Knowledge</i> you should have to perform this skill:	<p>How to perform the following tasks on system computers:</p> <ul style="list-style-type: none"> <li>• Perform functional checks</li> <li>• Clean, inspect, troubleshoot, replace components/subassemblies</li> </ul>
<i>References</i> you should study to gain the knowledge you need to perform this skill:	<ul style="list-style-type: none"> <li>• <i>User's Manual for AEGIS Tactical Executive System</i> (ATES/43); ACD 3106B</li> <li>• <i>User's Manual for AEGIS Tactical Utilities Function</i> (TUF); ACD 3296</li> <li>• <i>Data Processing Set AN/UYK-44 Organization Level Maintenance</i>; NAVSEA SE610-PV-MMO-010</li> <li>• <i>Data Processing Set AN/UYK-20 Organization Level Maintenance</i>; NAVSEA SE610-aV-MMO-010</li> <li>• <i>Operational Readiness Test System MK 7</i>; NAVSEA ST890-A3-AEG-010</li> <li>• <i>AN/UYK-7 Technical Summary Handbook</i>; NAVSEA 0967-LP-024-5800</li> <li>• <i>UNISYS AN/UYK-43 Abbreviated Reference Manual</i>; CDRL A114</li> <li>• MIP4121/009, /012, /R15, or associated MIP.</li> </ul>
<i>Exam Expectations.</i> These are subject areas you should know to help you answer exam questions correctly:	You can expect questions on all aspects of maintaining system computers.

## Advancement Handbook for FC3

General FC <i>Skill Area</i>	<b>Computer and Peripheral Maintenance</b>
A <i>skill</i> you are expected to perform from the General Skill Area above:	<b>Maintain computer maintenance panels</b>
<i>Knowledge</i> you should have to perform this skill:	<p>How to perform the following tasks on computer maintenance panels:</p> <ul style="list-style-type: none"> <li>• Perform functional checks</li> <li>• Clean and inspect</li> <li>• Troubleshoot</li> <li>• Replace components</li> </ul>
<i>References</i> you should study to gain the knowledge you need to perform this skill:	<ul style="list-style-type: none"> <li>• <i>Introduction to Number Systems and Logic Circuits</i>; NAVEDTRA B72-13-00-94; (NEETS MOD 13)</li> <li>• <i>Technical Manual for Operation and Maintenance Instructions for Computer Set AN/UYK-7(V)</i>; NAVSEA SE610-AW-MMA-010</li> <li>• <i>Technical Manual for Operation and Maintenance Instructions for Computer Set AN/UYK-43A(V)</i>; NAVSEA SE610-NV-MMO-010</li> <li>• MIP4121/009, MIP 4121/012, MIP 4121/R15, or associated MIP.</li> </ul>
<i>Exam Expectations.</i> These are subject areas you should know to help you answer exam questions correctly:	You can expect questions on all aspects of maintaining computer maintenance panels.

## Advancement Handbook for FC3

General FC <i>Skill Area</i>	<b>Computer and Peripheral Maintenance</b>
A <i>skill</i> you are expected to perform from the General Skill Area above:	<b>Maintain magnetic tape units (MTUs) and magnetic tape unit controllers</b>
<i>Knowledge</i> you should have to perform this skill:	<p>How to perform the following tasks on magnetic tape units and magnetic tape controllers:</p> <ul style="list-style-type: none"> <li>• Perform functional checks</li> <li>• Clean and inspect</li> <li>• Adjust and align (MTUs)</li> <li>• Lubricate (MTUs)</li> <li>• Troubleshoot</li> <li>• Replace components</li> </ul>
<i>References</i> you should study to gain the knowledge you need to perform this skill:	<ul style="list-style-type: none"> <li>• <i>Magnetic Recording</i>; NAVEDTRA B72-23-00-91; (NEETS MOD 23)</li> <li>• Appropriate MIP (MIP4121/005, MIP 4121/004, etc.)</li> <li>• <i>Maintenance Manual for Digital Magnetic Tape Recorder Reproducer RD-358A</i>; NAVSEA SE641-AE-MMO-010 and 020</li> </ul>
<i>Exam Expectations.</i> These are subject areas you should know to help you answer exam questions correctly:	You can expect questions on all aspects of maintaining magnetic tape units and magnetic tape controllers.

## Advancement Handbook for FC3

General FC <i>Skill Area</i>	<b>Computer and Peripheral Maintenance</b>
A <i>skill</i> you are expected to perform from the General Skill Area above:	<b>Maintain input/output (I/O) consoles</b>
<i>Knowledge</i> you should have to perform this skill:	<p>How to perform the following tasks on input/output (I/O) consoles:</p> <ul style="list-style-type: none"> <li>• Perform functional checks</li> <li>• Clean and inspect</li> <li>• Adjust and align</li> <li>• Troubleshoot</li> <li>• Replace components</li> </ul>
<i>References</i> you should study to gain the knowledge you need to perform this skill:	<ul style="list-style-type: none"> <li>• MIP 50RD005/003-95, 4121/R12-76, 4419/R05-49 or associated MIP.</li> <li>• <i>Software/Documentation Index; Maintenance Software Support Center</i>, NAVSEA 0967-LP-011-0172</li> <li>• <i>Console, Input/Output, OA-7984, Description, Operation, and Maintenance</i>, NAVSEA SE640-AZ-MMM-010</li> <li>• <i>Input/Output Console MK 77 Series Description, Operation, and Maintenance</i>, NAVSEA OP 3515</li> <li>• <i>Input/Output Console OJ-172</i>, NAVSEA SE640-AD-MMM-010/020/030</li> <li>• <i>Data Terminal Group OL-267</i>, NAVSEA SE640-AV-MMO-010/020/030, NAVSEA SE640-AW-MMO-010/020/030</li> <li>• <i>OA-7984 Input/Output Console, POFA Operating Procedures</i>, NAVSEA 0967-LP-011-6521</li> <li>• <i>OA-7984 Input/Output Console, POFA Program Listings</i>, NAVSEA 0967-LP-011-6531</li> </ul>

<i>Exam Expectations.</i> These are subject areas you should know to help you answer exam questions correctly:	You can expect questions on all aspects of maintaining input/output (I/O) consoles.
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## Advancement Handbook for FC3

General FC <i>Skill Area</i>	<b>Computer and Peripheral Maintenance</b>
A <i>skill</i> you are expected to perform from the General Skill Area above:	<b>Maintain data display consoles</b>
<i>Knowledge</i> you should have to perform this skill:	<p>How to perform the following tasks on data display consoles:</p> <ul style="list-style-type: none"> <li>• Perform functional checks</li> <li>• Clean and inspect</li> <li>• Adjust and align</li> <li>• Troubleshoot</li> <li>• Replace components</li> </ul>
<i>References</i> you should study to gain the knowledge you need to perform this skill:	<ul style="list-style-type: none"> <li>• Appropriate MIP (MIP 4111/003, 4111/005, 4111/R018, 4111/018, 58TOM05/003, etc.)</li> <li>• <i>AEGIS Display System Mk 2</i>; NAVSEA SE685-AP-AEG-010</li> <li>• <i>Technical Manual for Advanced Display System Combat System Console AN/UYQ-70</i>; NAVSEA SE686-CA-MMO-020</li> <li>• <i>Target Acquisition System MK 23 Mods 5-8</i>; NAVSEA SW230-AO-SOM-090</li> <li>• OJ- 663, OJ-451, OJ-452, OJ-454, and OJ-471 equipment manuals; NAVSEA SE685-AF-MMM-XXX (SERIES)</li> </ul>
<i>Exam Expectations.</i> These are subject areas you should know to help you answer exam questions correctly:	You can expect questions on all aspects of maintaining data display consoles.

## Advancement Handbook for FC3

General FC <i>Skill Area</i>	<b>Computer and Peripheral Maintenance</b>
A <i>skill</i> you are expected to perform from the General Skill Area above:	<b>Maintain weapons/engagement control consoles</b>
<i>Knowledge</i> you should have to perform this skill:	<p>How to perform the following tasks on data display consoles:</p> <ul style="list-style-type: none"> <li>• Perform functional checks</li> <li>• Clean and inspect</li> <li>• Adjust and align</li> <li>• Troubleshoot</li> <li>• Replace components</li> </ul>
<i>References</i> you should study to gain the knowledge you need to perform this skill:	<ul style="list-style-type: none"> <li>• Appropriate MIP (MIP 4111/003, 4111/005, 4111/R018, 4111/018, 58TOM05/003, etc.)</li> <li>• OJ- 663, OJ-451, and OJ-452, equipment manuals; NAVSEA SE685-AF-MMM-XXX (SERIES)</li> <li>• <i>OJ-578/SWG and OJ-579/SWG; Tomahawk OI DT Description, Operation, and Maintenance</i>, NAVSEA SW265-AO-MMO-010</li> <li>• <i>Tomahawk WCS Description, Operation, and Maintenance</i>, NAVSEA SW269-BA-MMO-160</li> <li>• <i>Harpoon Weapon System AN/SWG-1A Operator's Manual</i>, NAVSEA SW261-C7-SOM-010</li> <li>• <i>Harpoon Weapon System AN/SWG-1A Description, Operation, and Maintenance</i>, NAVSEA SW261-HT-MMO-020</li> </ul>

<i>Exam Expectations.</i> These are subject areas you should know to help you answer exam questions correctly:	You can expect questions on all aspects of maintaining weapons/engagement control consoles.
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## Advancement Handbook for FC3

General FC <i>Skill Area</i>	<b>Computer and Peripheral Maintenance</b>
A <i>skill</i> you are expected to perform from the General Skill Area above:	<b>Maintain video terminals</b>
<i>Knowledge</i> you should have to perform this skill:	<p>How to perform the following tasks on video terminals:</p> <ul style="list-style-type: none"> <li>• Perform functional checks</li> <li>• Clean and inspect</li> <li>• Adjust and align</li> <li>• Troubleshoot</li> <li>• Replace components</li> </ul>
<i>References</i> you should study to gain the knowledge you need to perform this skill:	<ul style="list-style-type: none"> <li>• <i>Video Amplifier AM1914C</i>; NAVSEA 0967-LP-726-2010</li> <li>• <i>PPI Display Console OJ-194(V)4</i>; NAVSEA 0967-LP-441-2010</li> <li>• <i>Operations Summary Console OJ-197</i>; NAVSEA 0967-LP-238-7150</li> <li>• <i>Display Control Console OJ-451</i>; NAVSEA SE685-AF-MMM-050</li> <li>• <i>Data Display Console OJ-454</i>; NAVSEA SE685-AJ-MMO-010</li> <li>• <i>Display Control Console OJ-471</i>; NAVSEA SE685-AF-MMM-130</li> </ul>
<i>Exam Expectations.</i> These are subject areas you should know to help you answer exam questions correctly:	You can expect questions on all aspects of maintaining video terminals.

## Advancement Handbook for FC3

General FC <i>Skill Area</i>	<b>Computer and Peripheral Maintenance</b>
A <i>skill</i> you are expected to perform from the General Skill Area above:	<b>Maintain printers and plotters</b>
<i>Knowledge</i> you should have to perform this skill:	<p>How to perform the following tasks on printers and plotters:</p> <ul style="list-style-type: none"> <li>• Perform functional checks</li> <li>• Clean and inspect</li> <li>• Troubleshoot</li> </ul>
<i>References</i> you should study to gain the knowledge you need to perform this skill:	<ul style="list-style-type: none"> <li>• <i>Printer/Plotter, Model 72A and Controller, Model 190, Description, Operation, and Maintenance</i>; NAVSEA SW282-E6-AEG-010; Appendix A</li> <li>• <i>Operator's Guide, B-Series Line Printers, with Acoustic Cabinet</i>; DATAPRODUCTS CORP 267720</li> <li>• <i>Maintenance Guide, B-Series Line Printers, with Acoustic Cabinet</i>; DATAPRODUCTS CORP 267726</li> <li>• <i>Master Support and Logistics Guide, B-Series Line Printers, with Acoustic Cabinet</i>; DATAPRODUCTS CORP 267788</li> <li>• MIP 4953/500 (series)</li> </ul>
<i>Exam Expectations.</i> These are subject areas you should know to help you answer exam questions correctly:	You can expect questions on all aspects of maintaining printers and plotters.

## Advancement Handbook for FC3

General FC <i>Skill Area</i>	<b>Computer and Peripheral Maintenance</b>
A <i>skill</i> you are expected to perform from the General Skill Area above:	<b>Maintain signal/data converters</b>
<i>Knowledge</i> you should have to perform this skill:	<p>How to perform the following tasks on signal/data converters:</p> <ul style="list-style-type: none"> <li>• Perform functional checks</li> <li>• Clean and inspect</li> <li>• Adjust</li> <li>• Troubleshoot</li> <li>• Replace converter components</li> </ul>
<i>References</i> you should study to gain the knowledge you need to perform this skill:	<ul style="list-style-type: none"> <li>• MIP 4141/R09-83 or associated MIP</li> <li>• POFA for appropriate converter (CV-2953 SDC, MK 72 SDC, CV-2356/UYA-4 SDC, CV3057 OU-91/UYA-4, etc.) See NAVSEA 0967-LP-011-0172 for applicable technical manual for your system/equipment.</li> <li>• Program listings for the appropriate converter</li> </ul>
<i>Exam Expectations.</i> These are subject areas you should know to help you answer exam questions correctly:	You can expect questions on all aspects of maintaining signal/data converters.

## Advancement Handbook for FC3

General FC <i>Skill Area</i>	<b>Computer Systems Operation</b>
A <i>skill</i> you are expected to perform from the General Skill Area above:	<b>Load and monitor system and operational programs</b>
<i>Knowledge</i> you should have to perform this skill:	<ul style="list-style-type: none"> <li>• How to load system and operational programs</li> <li>• Normal and abnormal program operating characteristics</li> </ul>
<i>References</i> you should study to gain the knowledge you need to perform this skill:	<ul style="list-style-type: none"> <li>• <i>User's Manual for AEGIS Tactical Executive System (ATES/43); ACD 3106B</i></li> <li>• CSOSS Books 1.1, 24.1, 31.1, and 46</li> <li>• <i>JMCIS/NTCS-A Unified Build User's Guide Volume 1; JMCIS/NTCSA-UG-001 V1</i></li> <li>• <i>JMCIS/NTCS-A Unified Build Training Manual, JMCIS/NTCSA-A-TM-001</i></li> <li>• <i>Operating Procedure for AN/UYK-7 Standard Test Driver UPAK; NAVSEA 0967-LP-011-2421</i></li> <li>• <i>Operating Procedure for Standard AN/UYK-43 Test Driver; NAVSEA 0967-LP-016-1000</i></li> <li>• <i>Operating Procedure for AN/UYK-43 to AN/UYK-43 Intercomputer POFA; NAVSEA 0967-LP-016-1570</i></li> <li>• <i>Operating Procedure for RD-358 Magnetic Tape Subsystem POFA; NAVSEA 0967-LP-016-2020</i></li> <li>• <i>Operating Procedure for AN/UYH-3 Disk System POFA; NAVSEA 0967-LP-016-2750</i></li> <li>• <i>Operating Procedure for the Xerox 72A Printer/Plotter W/Model 190C Controller; NAVSEA 0967-LP-016-2780</i></li> </ul>

<p><i>Exam Expectations.</i> These are subject areas you should know to help you answer exam questions correctly:</p>	<p>You can expect a variety of questions on loading and monitoring system and operational programs.</p>
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## Advancement Handbook for FC3

General FC <i>Skill Area</i>	<b>Computer Systems Operation</b>
A <i>skill</i> you are expected to perform from the General Skill Area above:	<b>Mount/change computer media</b>
<i>Knowledge</i> you should have to perform this skill:	<p>How to mount and change the following computer media:</p> <ul style="list-style-type: none"> <li>• Magnetic disk packs</li> <li>• CD-ROMs, floppy diskettes, and WORM disks</li> <li>• Magnetic tapes</li> </ul>
<i>References</i> you should study to gain the knowledge you need to perform this skill:	<ul style="list-style-type: none"> <li>• <i>User's Manual for AEGIS Tactical Executive System (ATES/43)</i>; ACD 3106B</li> <li>• CSOSS Books 1.1, 24.1, 31.1, and 46</li> <li>• PC equipment manuals</li> <li>• CD ROM equipment manuals</li> <li>• Floppy drive equipment manuals</li> <li>• RD-358 equipment manuals; NAVSEA SE641-AE-MMO-010</li> <li>• UYH-3 equipment manuals; NAVSEA SE600-AA-MMM-010/020/030/040/050</li> </ul>
<i>Exam Expectations.</i> These are subject areas you should know to help you answer exam questions correctly:	You can expect questions on the mounting and changing of computer media.

## Advancement Handbook for FC3

General FC <i>Skill Area</i>	<b>Computer Systems Operation</b>
A <i>skill</i> you are expected to perform from the General Skill Area above:	<b>Set up switchboards</b>
<i>Knowledge</i> you should have to perform this skill:	<ul style="list-style-type: none"><li>• Set-up procedures</li></ul>
<i>References</i> you should study to gain the knowledge you need to perform this skill:	<ul style="list-style-type: none"><li>• MIP 5ORD001/001-29, MIP 5ORD001/007-29, or Associated MIP</li></ul>
<i>Exam Expectations.</i> These are subject areas you should know to help you answer exam questions correctly:	You can expect questions on the procedures for setting up data interface patch panels and automated/manual switchboards.

## Advancement Handbook for FC3

General FC <i>Skill Area</i>	<b>Computer Systems Operation</b>
A <i>skill</i> you are expected to perform from the General Skill Area above:	<b>Set up the tactical data system for dual operational and training modes</b>
<i>Knowledge</i> you should have to perform this skill:	<ul style="list-style-type: none"><li>• Set-up procedures</li></ul>
<i>References</i> you should study to gain the knowledge you need to perform this skill:	<ul style="list-style-type: none"><li>• <i>User's Manual for AEGIS Tactical Executive System (ATES/43)</i>; ACD 3106B</li><li>• CSOSS Books 1.1, 24.1, 31.1, and 46</li><li>• Quick Reference Guide (QRG)</li></ul>
<i>Exam Expectations.</i> These are subject areas you should know to help you answer exam questions correctly:	You can expect questions on setting up the tactical data system for dual modes of operation.

## Advancement Handbook for FC3

General FC <i>Skill Area</i>	<b>Weapons Handling/Maintenance</b>
A <i>skill</i> you are expected to perform from the General Skill Area above:	<b>Perform weapon-handling operations</b>
<i>Knowledge</i> you should have to perform this skill:	<p>How to:</p> <ul style="list-style-type: none"> <li>• On/off-load weapons &amp; components</li> <li>• Can/uncan weapons &amp; components</li> <li>• Stow weapons &amp; components</li> <li>• Operate weapon handling equipment</li> </ul>
<i>References</i> you should study to gain the knowledge you need to perform this skill:	<ul style="list-style-type: none"> <li>• <i>Approved Handling Equipment for Weapons and Explosives</i>; NAVSEA OP 2173</li> <li>• <i>Ammunition Afloat</i>; NAVSEA OP 4</li> <li>• <i>Supply Management of Ammunition</i>; SPCCINST 8010.12</li> <li>• <i>Ammunition and Explosives Ashore, safety Regulations for Handling , Storing, Production, Renovation and Shipping</i>; NAVSEA OP 5</li> <li>• <i>Motor Vehicle Driver's Handbook, Ammunition, Explosives and Related Hazardous Materials</i>; NAVSEA OP2239</li> <li>• NSTM Chapter 700; <i>Shipboard Ammunition Handling and Stowage</i>; NAVSEA S9086-XG-STM-010</li> <li>• NSTM Chapter 772; <i>Cargo and Weapons Elevators</i>; NAVSEA S9086-ZN-STM-010</li> </ul>
<i>Exam Expectations.</i> These are subject areas you should know to help you answer exam questions correctly:	You can expect questions on canning and un-canning of weapons; on/off loading of weapons, stowing weapons, operating weapons handling equipment, and disposing of damaged weapons.

## Advancement Handbook for FC3

General FC <i>Skill Area</i>	<b>Weapons Handling/Maintenance</b>
A <i>skill</i> you are expected to perform from the General Skill Area above:	<b>Perform weapons maintenance procedures</b>
<i>Knowledge</i> you should have to perform this skill:	<p>How to:</p> <ul style="list-style-type: none"> <li>• Verify weapon life spans</li> <li>• Inspect weapon and weapon components containers</li> <li>• Perform functional checks on weapon ventilation systems</li> <li>• Perform inspection on magazine sprinkler systems</li> </ul>
<i>References</i> you should study to gain the knowledge you need to perform this skill:	<ul style="list-style-type: none"> <li>• <i>Identification of Ammunition</i>; NAVSEA SW010-AF-ORD-010</li> <li>• <i>USN Ordnance Safety Precautions</i>; NAVSEA OP 3347</li> <li>• <i>Ammunition Afloat</i>; NAVSEA OP 4</li> <li>• <i>Magazine Sprinkler Systems Description, Operation, and Maintenance Handbook</i>, NAVSEA S9522-LP-AA-HBK-010</li> <li>• <i>Toxic Gas Damper control System</i>, NAVSEA S6230-BQ-MMO-010</li> <li>• MIP</li> </ul>
<i>Exam Expectations.</i> These are subject areas you should know to help you answer exam questions correctly:	You can expect questions on verifying weapon life span; inspecting containers, ventilation dampers and components; and performing magazine sprinkler systems.

## Advancement Handbook for FC3

General FC <i>Skill Area</i>	<b>Combat Direction / Weapons Direction / Fire-Control Systems Maintenance</b>
A <i>skill</i> you are expected to perform from the General Skill Area above:	<b>Conduct benchmark and transmission checks during system operation</b>
<i>Knowledge</i> you should have to perform this skill:	How to conduct: <ul style="list-style-type: none"> <li>• Conduct benchmark checks</li> <li>• Conduct transmission checks</li> </ul>
<i>References</i> you should study to gain the knowledge you need to perform this skill:	<ul style="list-style-type: none"> <li>• <i>Theory of Combat System Alignment</i>; NAVSEA SW225-AO-MMA-010</li> <li>• <i>Combat System Alignment Manual</i>; NAVSEA SW225-CL-CSA-010</li> <li>• <i>Microwave Principles</i>; NAVEDTRA 172-11-00-87; (NEETS MOD 11)</li> <li>• <i>Modulation Principles</i>; NAVEDTRA 172-12-00-83; (NEETS MOD 12)</li> </ul>
<i>Exam Expectations.</i> These are subject areas you should know to help you answer exam questions correctly:	You can expect questions on conducting benchmark and transmission checks

## Advancement Handbook for FC3

General FC <i>Skill Area</i>	<b>Combat Direction / Weapons Direction / Fire-Control Systems Maintenance</b>
A <i>skill</i> you are expected to perform from the General Skill Area above:	<b>Verify and record benchmark readings, tram element, and data</b>
<i>Knowledge</i> you should have to perform this skill:	How to conduct: <ul style="list-style-type: none"> <li>• Benchmark checks, and</li> <li>• Tram element</li> <li>• Data collection</li> </ul>
<i>References</i> you should study to gain the knowledge you need to perform this skill:	<ul style="list-style-type: none"> <li>• <i>Theory of Combat System Alignment</i>; NAVSEA SW225-AO-MMA-010</li> <li>• <i>Combat System Alignment Manual</i>; NAVSEA SW225-CL-CSA-010</li> <li>• <i>Microwave Principles</i>; NAVEDTRA 172-11-00-87; (NEETS MOD 11)</li> <li>• <i>Modulation Principles</i>; NAVEDTRA 172-12-00-83; (NEETS MOD 12)</li> </ul>
<i>Exam Expectations.</i> These are subject areas you should know to help you answer exam questions correctly:	You can expect questions on conducting benchmark checks, aligning search radar, and performing relative track alignments.

## Advancement Handbook for FC3

General FC <i>Skill Area</i>	<b>Combat Directions / Weapons Direction / Fire-Control System Maintenance</b>
A <i>skill</i> you are expected to perform from the General Skill Area above:	<b>Perform dynamic accuracy tests on GFC equipment and analyze the test results</b>
<i>Knowledge</i> you should have to perform this skill:	<p>How to:</p> <ul style="list-style-type: none"> <li>• Perform dynamic accuracy tests on GFC equipment</li> <li>• Analyze the results of dynamic accuracy tests on GFC and GMFC equipment</li> </ul>
<i>References</i> you should study to gain the knowledge you need to perform this skill:	<ul style="list-style-type: none"> <li>• <i>Theory of Combat System Alignment</i>; NAVSEA SW225-AO-MMA-010</li> <li>• <i>Combat System Alignment Manual</i>; NAVSEA SW225-CL-CSA-010</li> <li>• <i>Operating Procedures for AN/UYK-7 Standard Test Driver UPAK</i>; NAVSEA 0967-LP-011-2421</li> <li>• <i>Operating Procedures for Standard AN/UYK-43 Test Driver</i>; NAVSEA 0967-LP-016-1570</li> <li>• <i>AEGIS Computer Operator, Operation, Monitoring, and Recovery Procedures</i>; NAVSEA SW274-A6-AEG-010</li> <li>• <i>AEGIS Computer Operator, Operation, Monitoring, and Recovery Procedures</i>; NAVSEA SW274-A6-AEG-020</li> <li>• MIP for OCSOT, CSOT, CSAT, &amp; POFA</li> </ul>
<i>Exam Expectations.</i> These are subject areas you should know to help you answer exam questions correctly:	You can expect questions on performing and analyzing the results of dynamic accuracy tests on GFC and GMFC equipment.

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General FC <i>Skill Area</i>	<b>Combat Direction / Weapons Direction / Fire-Control Systems Maintenance</b>
A <i>skill</i> you are expected to perform from the General Skill Area above:	<b>Conduct search radar and relative track alignments</b>
<i>Knowledge</i> you should have to perform this skill:	How to conduct: <ul style="list-style-type: none"> <li>• Search radar alignments</li> <li>• Relative track alignments</li> <li>• Track accuracy</li> </ul>
<i>References</i> you should study to gain the knowledge you need to perform this skill:	<ul style="list-style-type: none"> <li>• <i>Theory of Combat System Alignment</i>, NAVSEA SW225-AO-MMA-010</li> <li>• <i>Combat System Alignment Manual</i>, NAVSEA SW225-CL-CSA-010</li> <li>• <i>Microwave Principles</i>, NAVEDTRA 172-11-00-87; (NEETS MOD 11)</li> <li>• <i>Modulation Principles</i>, NAVEDTRA 172-12-00-83; (NEETS MOD 12)</li> </ul>
<i>Exam Expectations.</i> These are subject areas you should know to help you answer exam questions correctly:	You can expect questions on conducting aligning search radar, and performing relative track alignments.

## Advancement Handbook for FC3

General FC <i>Skill Area</i>	<b>Combat Directions / Weapons Direction / Fire-Control System Maintenance</b>
A <i>skill</i> you are expected to perform from the General Skill Area above:	<b>Maintain target designation transmitters (TDT)</b>
<i>Knowledge</i> you should have to perform this skill:	How to perform the following tasks on TDT: <ul style="list-style-type: none"> <li>• Perform functional checks</li> <li>• Clean and inspect</li> <li>• Adjust and align</li> <li>• Troubleshoot</li> <li>• Replace components</li> </ul>
<i>References</i> you should study to gain the knowledge you need to perform this skill:	<ul style="list-style-type: none"> <li>• <i>Principles of Synchros, Servos, and Gyros</i>; NAVEDTRA B72-15-00-93; (NEETS VOL 15)</li> <li>• <i>Introduction to Test Equipment</i>; NAVEDTRA B72-16-00-96; (NEETS VOL 16)</li> <li>• <i>Introduction to Alternating Current and Transformers</i>; NAVEDTRA 172-02-00-91; (NEETS VOL 2)</li> <li>• <i>TDT MK24 Control Unit, Status Panel, and Switching Panel</i>; NAVSEA SW230-EO-MMA-010</li> <li>• <i>COSAL Use and Maintenance Manual</i>, SPCCINST 4441.170</li> <li>• MIP 4841/001-47, 4816/010-47, or associated MIP</li> </ul>
<i>Exam Expectations.</i> These are subject areas you should know to help you answer exam questions correctly:	You can expect questions on all aspects of maintaining TDTs.

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General FC <i>Skill Area</i>	<b>Combat Direction / Weapons Direction / Fire-Control Systems Maintenance</b>
A <i>skill</i> you are expected to perform from the General Skill Area above:	<b>Maintain tracking receivers</b>
<i>Knowledge</i> you should have to perform this skill:	How to perform the following tasks on tracking receivers : <ul style="list-style-type: none"> <li>• Perform functional checks</li> <li>• Clean and inspect</li> <li>• Adjust and align</li> <li>• Troubleshoot</li> <li>• Replace components</li> </ul>
<i>References</i> you should study to gain the knowledge you need to perform this skill:	<ul style="list-style-type: none"> <li>• <i>AEGIS Auxiliary Equipment Group for AN/SPY-1D, Description, Operation, and Maintenance</i>; NAVSEA SW279-CU-AEG-010</li> <li>• MIP 4840/009-49, 4818/012-49, 4821/004-49, 4560/504-39, or associated MIP</li> </ul>
<i>Exam Expectations.</i> These are subject areas you should know to help you answer exam questions correctly:	You can expect questions on all aspects of maintaining tracking receivers.

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General FC <i>Skill Area</i>	<b>Combat Direction / Weapons Direction / Fire-Control Systems Maintenance</b>
A <i>skill</i> you are expected to perform from the General Skill Area above:	<b>Maintain tracking transmitters</b>
<i>Knowledge</i> you should have to perform this skill:	How to perform the following tasks on tracking transmitters <ul style="list-style-type: none"> <li>• Perform functional checks</li> <li>• Clean and inspect</li> <li>• Adjust and align</li> <li>• Troubleshoot</li> <li>• Replace components</li> </ul>
<i>References</i> you should study to gain the knowledge you need to perform this skill:	<ul style="list-style-type: none"> <li>• <i>AEGIS Auxiliary Equipment Group for AN/SPY-1D, Description, Operation, and Maintenance</i>; NAVSEA SW279-CU-AEG-010</li> <li>• MIP 4840/009-49, 4818/012-49, 4821/004-49, 4560/504-39, or associated MIP</li> </ul>
<i>Exam Expectations.</i> These are subject areas you should know to help you answer exam questions correctly:	You can expect questions on all aspects of maintaining tracking transmitters.

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General FC <i>Skill Area</i>	<b>Combat Direction / Weapons Direction / Fire-Control Systems Maintenance</b>
A <i>skill</i> you are expected to perform from the General Skill Area above:	<b>Maintain CWI transmitters</b>
<i>Knowledge</i> you should have to perform this skill:	How to perform the following tasks on CWI transmitters : <ul style="list-style-type: none"> <li>• Perform functional checks</li> <li>• Adjust and align</li> <li>• Troubleshoot</li> <li>• Replace components</li> <li>• Clean and inspect</li> </ul>
<i>References</i> you should study to gain the knowledge you need to perform this skill:	<ul style="list-style-type: none"> <li>• <i>FCS Transmitter T-1348/SPG</i>; NAVSEA SE140-AG-AEG-000</li> <li>• <i>CWI Transmitter T-1085/SPG-51D</i>; NAVSEA OP 4350</li> <li>• MIP 4840/004-49, 4829/U02-49, 4829/001-49, or associated MIP</li> </ul>
<i>Exam Expectations.</i> These are subject areas you should know to help you answer exam questions correctly:	You can expect questions on all aspects of maintaining CWI transmitters.

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General FC <i>Skill Area</i>	<b>Combat Directions / Weapons Direction / Fire-Control System Maintenance</b>
A <i>skill</i> you are expected to perform from the General Skill Area above:	<b>Collimate radar</b>
<i>Knowledge</i> you should have to perform this skill:	How to: <ul style="list-style-type: none"> <li>• Read data during battery alignment</li> <li>• Plot data during battery alignment</li> <li>• Collimate radar</li> </ul>
<i>References</i> you should study to gain the knowledge you need to perform this skill:	<ul style="list-style-type: none"> <li>• <i>Theory of Combat System Alignment</i>; NAVSEA SW225-AO-MMA-010</li> <li>• <i>Combat System Alignment Manual</i>; NAVSEA SW225-CL-CSA-010</li> <li>• <i>Principles of Synchros, Servos, and Gyros</i>; NAVEDTRA B72-15-00-93; (NEETS VOL 15)</li> <li>• <i>Introduction to Test Equipment</i>; NAVEDTRA B72-16-00-96; (NEETS VOL 16)</li> <li>• Radar transmitter manuals for your specific platform (i.e. AN/SPY-1 series, AN/SPS-48 series, FCS MK 99 series, etc.)</li> </ul>
<i>Exam Expectations.</i> These are subject areas you should know to help you answer exam questions correctly:	You can expect questions on testing and aligning transmission devices.

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General FC <i>Skill Area</i>	<b>Combat Direction / Weapons Direction / Fire-Control Systems Maintenance</b>
A <i>skill</i> you are expected to perform from the General Skill Area above:	<b>Interpret display symbology</b>
<i>Knowledge</i> you should have to perform this skill:	<ul style="list-style-type: none"> <li>• Understanding of display symbols</li> <li>• How to interpret display symbology</li> </ul>
<i>References</i> you should study to gain the knowledge you need to perform this skill:	<ul style="list-style-type: none"> <li>• <i>Standard Fire Control Symbols</i>; NAVORD OP 1700 VOL 1</li> </ul>
<i>Exam Expectations.</i> These are subject areas you should know to help you answer exam questions correctly:	You can expect questions on the interpreting display symbols.

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General FC <i>Skill Area</i>	<b>Combat Direction / Weapons Direction / Fire-Control Systems Maintenance</b>
A <i>skill</i> you are expected to perform from the General Skill Area above:	<b>Perform battery alignment</b>
<i>Knowledge</i> you should have to perform this skill:	How to: <ul style="list-style-type: none"> <li>• Perform battery alignment</li> </ul>
<i>References</i> you should study to gain the knowledge you need to perform this skill:	<ul style="list-style-type: none"> <li>• <i>Combat Systems Alignment Manual (CSAM) for CG-47 Class</i>; NAVSEA SW225-BN-CSA-010</li> <li>• <i>Theory of Combat System Alignment</i>; NAVSEA SW225-AO-MMA-010</li> <li>• <i>Specification for Building Guided Missile Cruiser CG-47</i>; T9DDG-BQ-SBS-010</li> <li>• <i>Radar Collimation Shore Tower, DOM Manual</i>; NAVSEA SW279-CM-MMA-010</li> <li>• <i>Surface Missile Systems Radar Collimation Tower Facility Location and Description</i>; NAVSEA SW279-CM-IDX-010</li> <li>• <i>Synchros, Description and Operation</i>; MIL-HDBK-225 (AS)</li> <li>• <i>Electromagnetic Radiation Hazards</i>; NAVSEA OP 3565</li> <li>• <i>Standard Fire Control Symbols</i>; NAVSEA OP 1700</li> <li>• Various equipment manuals</li> </ul>
<i>Exam Expectations.</i> These are subject areas you should know to help you answer exam questions correctly:	You can expect questions on performing battery alignment.

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General FC <i>Skill Area</i>	<b>Combat Direction / Weapons Direction / Fire-Control Systems Operations</b>
A <i>skill</i> you are expected to perform from the General Skill Area above:	<b>Perform pre-fire checks</b>
<i>Knowledge</i> you should have to perform this skill:	How to: <ul style="list-style-type: none"> <li>• Perform pre-fire checks</li> </ul>
<i>References</i> you should study to gain the knowledge you need to perform this skill:	<ul style="list-style-type: none"> <li>• <i>Identification of Ammo</i>; NAVSEA OP 2238</li> <li>• CSOSS Books 1.4 and 1.5</li> <li>• MIP 7112/R07-49 (R-4), 4818/012-49(R7), 4801/006-49, 7111/002-49 (R1), or associated MIP</li> <li>• Ship's instructions</li> <li>• Ship's battle doctrine</li> </ul>
<i>Exam Expectations.</i> These are subject areas you should know to help you answer exam questions correctly:	You can expect questions on performing pre-fire checks on various combat weapon systems.

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General FC <i>Skill Area</i>	<b>Combat Direction / Weapons Direction / Fire-Control Systems Operations</b>
A <i>skill</i> you are expected to perform from the General Skill Area above:	<b>Perform self-tests and IDs on weapons</b>
<i>Knowledge</i> you should have to perform this skill:	How to: <ul style="list-style-type: none"> <li>• Perform weapon tests</li> <li>• Interpret test results</li> </ul>
<i>References</i> you should study to gain the knowledge you need to perform this skill:	<ul style="list-style-type: none"> <li>• <i>Identification of Ammo</i>; NAVSEA OP 2238</li> <li>• QRGs</li> </ul>
<i>Exam Expectations.</i> These are subject areas you should know to help you answer exam questions correctly:	You can expect questions on tests you may be expected to perform on ship's weapons.

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General FC <i>Skill Area</i>	<b>Combat Direction / Weapons Direction / Fire-Control Systems Operations</b>
A <i>skill</i> you are expected to perform from the General Skill Area above:	<b>Reconfigure for degraded weapon system</b>
<i>Knowledge</i> you should have to perform this skill:	<ul style="list-style-type: none"> <li>• How to reconfigure equipment</li> <li>• Procedures and reports for reconfiguring</li> </ul>
<i>References</i> you should study to gain the knowledge you need to perform this skill:	<ul style="list-style-type: none"> <li>• CSOSS Books 1.1, 24.1, 31.1, and 46</li> <li>• <i>Operational Readiness Test System MK 7, Description, Operation and Maintenance</i>; NAVSEA ST890-A3-AEG-010</li> <li>• <i>DDG 993 NTU MR Missile General Description</i>; NAVSEA SW261-AJ-OPI-020/(c)</li> <li>• <i>DDG 993 NTU MR Missile Functional Description</i>; NAVSEA SW261-AJ-OPI-030/(c)</li> <li>• <i>HARPOON Weapon System</i>; NAVSEA SW261-C5-MMO-010</li> <li>• <i>TOMOHAWK Weapon System</i>; NAVSEA SW261-PO-MMO-010</li> <li>• <i>AEGIS Weapon System Maintenance and Readiness</i>; NAVSEA SW271-A7-AEG-010</li> <li>• <i>FCS MK 99</i>; NAVSEA SW271-B1-AEG-010</li> </ul>
<i>Exam Expectations.</i> These are subject areas you should know to help you answer exam questions correctly:	You can expect questions on reconfiguring combat system equipment.

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General FC <i>Skill Area</i>	<b>Combat Direction / Weapons Direction / Fire-Control Systems Operations</b>
A <i>skill</i> you are expected to perform from the General Skill Area above:	<b>Validate system calibrations go and perform post-fire checks</b>
<i>Knowledge</i> you should have to perform this skill:	How to: <ul style="list-style-type: none"> <li>• Operate CIWS &amp; GWS</li> <li>• Perform post-fire checks</li> </ul>
<i>References</i> you should study to gain the knowledge you need to perform this skill:	<ul style="list-style-type: none"> <li>• <i>Introduction to CIWS</i>; OP 4154 VOL 1</li> <li>• <i>PHALANX Weapon System MK 15 Mod 12</i>; NAVSEA SW221-JO-MMO-010</li> <li>• CSOSS Books 1.4 and 1.5</li> <li>• MIP 7112/R07-49 (R-4), 4818/012-49(R7), 4801/006-49, 7111/002-49 (R1), or associated MIP</li> <li>• <i>Fluid Power</i>; NAVPERS 16193-B</li> <li>• QRGs</li> </ul>
<i>Exam Expectations.</i> These are subject areas you should know to help you answer exam questions correctly:	You can expect questions on CIWS operation and post-fire procedures.

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General FC <i>Skill Area</i>	<b>Combat Direction / Weapons Direction / Fire-Control Systems Operations</b>
A <i>skill</i> you are expected to perform from the General Skill Area above:	<b>Acquire, select, and track targets and missiles</b>
<i>Knowledge</i> you should have to perform this skill:	<p>How to:</p> <ul style="list-style-type: none"> <li>• Manually track targets</li> <li>• Select a target for acquisition</li> <li>• Select missiles</li> <li>• Aid in target acquisition</li> <li>• Optimize target tracks</li> </ul>
<i>References</i> you should study to gain the knowledge you need to perform this skill:	<ul style="list-style-type: none"> <li>• <i>AEGIS Combat System Console Operator Introduction Manual</i>; NAVSEA S9410-AM-AEG-010</li> <li>• <i>Antiair Warfare</i>; NWP 3-20.71; CH4</li> <li>• <i>Naval Warfare Publication System</i>; NWP 1-01</li> <li>• <i>Antiair Warfare</i>; NWP 32</li> <li>• <i>Surface Ship TOMOHAWK Weapon System and Tactics</i>; NWP 62-2A</li> <li>• <i>Surface Ship AAW Tactics</i>, NWP 63</li> <li>• <i>Surface Launched HARPOON Weapon System and Tactics</i>; NWP 64-2-1</li> <li>• <i>Target Motion Analysis Techniques</i>; NWP 71-1-1</li> </ul>
<i>Exam Expectations.</i> These are subject areas you should know to help you answer exam questions correctly:	You can expect questions on tracking targets, selecting targets, and selecting missiles.

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General FC <i>Skill Area</i>	<b>Combat Direction / Weapons Direction / Fire-Control Systems Operations</b>
<i>A skill</i> you are expected to perform from the General Skill Area above:	<b>Verify and evaluate target and weapon parameters</b>
<i>Knowledge</i> you should have to perform this skill:	<p>How to:</p> <ul style="list-style-type: none"> <li>• Apply target and round spotting</li> <li>• Verify ballistic solution, coast mode, gun/missile orders, control of directors, READY TO FIRE, weapon away, rounds fired, and weapon intercept</li> <li>• Evaluate target threat parameters &amp; accuracy of rounds</li> <li>• Identify gun misfires &amp; video separation</li> <li>• Place gun mount in safe fire position</li> </ul>
<i>References</i> you should study to gain the knowledge you need to perform this skill:	<ul style="list-style-type: none"> <li>• <i>Antiair Warfare</i>; NWP 3-20.71; CH4</li> <li>• <i>AEGIS Combat System Console Operator Introduction Manual</i>; NAVSEA S9410-AM-AEG-010</li> <li>• CSOSS Books 30, 44, 52, 64, and 65</li> <li>• <i>QRG for CSC &amp; RSC</i></li> <li>• Battle doctrine</li> <li>• Reporting procedures</li> </ul>
<i>Exam Expectations.</i> These are subject areas you should know to help you answer exam questions correctly:	You can expect questions on verifying coast mode, weapon orders, control of directors, READY TO FIRE, weapon away, rounds fired and weapon intercept as well as evaluating accuracy of rounds and identifying gun misfires

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General FC <i>Skill Area</i>	<b>Combat Direction / Weapons Direction / Fire-Control System Operations</b>
A <i>skill</i> you are expected to perform from the General Skill Area above:	<b>Identify air/surface target video characteristics</b>
<i>Knowledge</i> you should have to perform this skill:	<ul style="list-style-type: none"> <li>• Console symbology</li> <li>• Console operations</li> <li>• Friendly vs. hostile target video characteristics</li> </ul>
<i>References</i> you should study to gain the knowledge you need to perform this skill:	<ul style="list-style-type: none"> <li>• <i>AEGIS Combat System Console Operator Introduction Manual</i>; NAVSEA S9410-AM-AEG-010</li> <li>• <i>Standard Fire Control Symbols</i>; NAVORD OP 1700 VOLUME 1</li> <li>• <i>Allied Maritime Tactical Instructions and Procedures</i>; ATP 1, Vol. 1; Ch. 7</li> <li>• <i>Antiair Warfare</i>; NWP 3-01.01; Ch. 3, 4, App E</li> </ul>
<i>Exam Expectations.</i> These are subject areas you should know to help you answer exam questions correctly:	You can expect questions on target video characteristics.

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General FC <i>Skill Area</i>	<b>Combat Direction / Weapons Direction / Fire-Control Systems Operations</b>
A <i>skill</i> you are expected to perform from the General Skill Area above:	<b>Perform console operations</b>
<i>Knowledge</i> you should have to perform this skill:	How to: <ul style="list-style-type: none"> <li>• Adjust radar presentations</li> <li>• Destroy missiles in flight</li> <li>• Input environmental data</li> <li>• Close firing circuits</li> </ul>
<i>References</i> you should study to gain the knowledge you need to perform this skill:	<ul style="list-style-type: none"> <li>• <i>Gun Fire Control System MK 86 Mods 8,9,10, and 12, Description, Operation and Maintenance</i>; NAVSEA SW235-CB-MMO-010</li> <li>• <i>Range Tables</i>; NAVSEA SW323-AF-ORD-010</li> <li>• <i>CSTOM</i>; NAVSEA S9CGO-BR-CSM-040</li> <li>• <i>CSTOM</i>; NAVSEA S9CGO-BR-CSM-050</li> <li>• <i>CSTOM</i>; NAVSEA S9CGO-BR-CSM-060</li> <li>• QRGs</li> <li>• CSOSS Books 1.1, 24.1, 31.1, and 33</li> </ul>
<i>Exam Expectations.</i> These are subject areas you should know to help you answer exam questions correctly:	You can expect questions on adjusting radar presentations, destroying missiles in flight, inputting environmental data, closing firing circuits, initiating dud fire procedures, and placing gun mounts in the safe fire position.

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General FC <i>Skill Area</i>	<b>Combat Direction / Weapons Direction / Fire-Control Systems Operations</b>
A <i>skill</i> you are expected to perform from the General Skill Area above:	<b>Designate fire control radar; assign launchers, missiles, and guns</b>
<i>Knowledge</i> you should have to perform this skill:	<ul style="list-style-type: none"> <li>• Battle doctrine</li> <li>• Reporting procedures</li> </ul>
<i>References</i> you should study to gain the knowledge you need to perform this skill:	<ul style="list-style-type: none"> <li>• <i>AEGIS Combat System Console Operator Introduction Manual</i>; NAVSEA S9410-AM-AEG-010</li> <li>• <i>Standard Missile Series RIM-66</i>; NAVSEA SW800-AB-MMO-010</li> <li>• CSOSS Books 30, 44, 52, 64, and 65</li> <li>• <i>Class Combat System Doctrine</i>; COMNAVSURFLANT/COMNAVSURFPAC C3516 series</li> <li>• <i>Radiotelephone Procedures for Conduct of Artillery and Naval Gunfire</i>; ACP 125E</li> <li>• <i>Allied Spotting Procedures for Naval Gunfire Support</i>; ATP 4</li> <li>• <i>Joint Reporting System Naval Surface Fire Support Messages</i>; NWP 1-03.35</li> <li>• <i>Basic Operational Communications Doctrine</i>; NWP 4</li> <li>• QRGs</li> </ul>
<i>Exam Expectations.</i> These are subject areas you should know to help you answer exam questions correctly:	You can expect questions on designating fire control radar and on assigning launchers, missiles, and guns.

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General FC <i>Skill Area</i>	<b>Combat Directions / Weapons Direction / Fire-Control System Operations</b>
A <i>skill</i> you are expected to perform from the General Skill Area above:	<b>Identify duds, misfires, hangfires, and restrain fires</b>
<i>Knowledge</i> you should have to perform this skill:	How to: <ul style="list-style-type: none"> <li>• Identify duds, misfires, hangfires, and restrain fires</li> <li>• Initiate weapon jettison</li> </ul>
<i>References</i> you should study to gain the knowledge you need to perform this skill:	<ul style="list-style-type: none"> <li>• <i>Allied Naval Gunfire Support</i>; Allied Tactical Publication, ATP 4; Ch. 2, 3</li> <li>• <i>Naval Surface Gunnery</i>; NWP 3-20.32; Ch. 8, App. C</li> <li>• <i>Radiotelephone Procedures for the Conduct of Artillery and Naval Gunfire</i>; Allied Communication Publication, ACP-125 U.S. SUPP-2</li> <li>• Ship's battle doctrine</li> </ul>
<i>Exam Expectations.</i> These are subject areas you should know to help you answer exam questions correctly:	You can expect questions on identifying duds, misfires, hangfires, and restrain fires as well as initiating weapon jettison procedures.

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General FC <i>Skill Area</i>	<b>Combat Direction / Weapons Direction / Fire-Control Systems Operations</b>
<i>A skill</i> you are expected to perform from the General Skill Area above:	<b>Energize/de-energize electronic equipment</b>
<i>Knowledge</i> you should have to perform this skill:	<ul style="list-style-type: none"> <li>• How to energize and de-energize various electronic equipment in the Combat Information Center</li> </ul>
<i>References</i> you should study to gain the knowledge you need to perform this skill:	<ul style="list-style-type: none"> <li>• CSOSS manuals; (refer to your specific equipment)</li> <li>• NAVSEA manuals covering your ship's specific radar</li> <li>• <i>Indicator Group AN/SPA-25G (General Information and Operations)</i>; NAVSEA SE251-DG-MMO-010</li> <li>• <i>JMCIS/NTCSA Users Guide Vol. I</i>; JMCIS/NTCSA-UG-001; Ch. 2</li> <li>• <i>U.S. Tactical Digital Information Link (TADIL) Standard Operating Procedures (TSOP)</i>; OPNAVINST C3120.44</li> <li>• <i>Standard Operating Procedures for NATO Link-11</i>; ADATP 11</li> <li>• <i>XXX Class Combat Systems Doctrine</i>; COFCAVSURFLANT/COFCAVSURFPAC INST C3516 series</li> </ul>
<i>Exam Expectations.</i> These are subject areas you should know to help you answer exam questions correctly:	You can expect questions on the procedures used to energize and de-energize electronic equipment in CIC.

## Advancement Handbook for FC3

General FC <i>Skill Area</i>	<b>Combat Direction / Weapons Direction / Fire-Control Systems Operations</b>
A <i>skill</i> you are expected to perform from the General Skill Area above:	<b>Operate Naval Tactical Data System (NTDS) equipment</b>
<i>Knowledge</i> you should have to perform this skill:	How to: <ul style="list-style-type: none"> <li>• Operate TDS equipment</li> <li>• Monitor TDS information</li> <li>• Enter/update TDS initialization data</li> <li>• Operate TDS equipment under casualty conditions</li> <li>• Report TDS malfunctions</li> </ul>
<i>References</i> you should study to gain the knowledge you need to perform this skill:	<ul style="list-style-type: none"> <li>• CSOSS Book 68</li> <li>• Systems operation manuals (SOMs)</li> </ul>
<i>Exam Expectations.</i> These are subject areas you should know to help you answer exam questions correctly:	You can expect questions on the operation of NTDS equipment in both casualty and normal modes of operation.

## Advancement Handbook for FC3

General FC <i>Skill Area</i>	<b>Combat Direction / Weapons Direction / Fire-Control System Operations</b>
A <i>skill</i> you are expected to perform from the General Skill Area above:	<b>Operate Identification Friend or Foe (IFF) equipment</b>
<i>Knowledge</i> you should have to perform this skill:	How to: <ul style="list-style-type: none"> <li>• Operate IFF equipment under normal and casualty conditions</li> </ul>
<i>References</i> you should study to gain the knowledge you need to perform this skill:	<ul style="list-style-type: none"> <li>• CSOSS Book 68</li> <li>• <i>IFF/SIF Operational Procedures</i>, Allied Communication Publication; ACP-160</li> <li>• <i>Programmed Instruction Handbook for Decoder Group AN/UPA-59(V)2</i>; NAVEXLEX 0967-LP-374-7050</li> <li>• <i>Operator's Instruction for Shipboard AIMS MK 12 IFF Systems</i>; NAVSEA 0967-LP-390-8040</li> <li>• QRGs</li> </ul>
<i>Exam Expectations.</i> These are subject areas you should know to help you answer exam questions correctly:	You can expect questions on operating the AIMS MK XII and AN/UPA-59 equipment installed onboard your ship.

## Advancement Handbook for FC3

General FC <i>Skill Area</i>	<b>Combat Direction / Weapons Direction / Fire-Control Systems Operations</b>
A <i>skill</i> you are expected to perform from the General Skill Area above:	<b>Operate Naval Tactical Command Systems Afloat (NTCS-A)/Joint Maritime Control Information Systems (JMCIS) equipment in various modes</b>
<i>Knowledge</i> you should have to perform this skill:	How to: <ul style="list-style-type: none"> <li>• Operate Naval Tactical Command Afloat (NTCS-A)/Joint Maritime Control Information System (JMCIS) in the participant mode</li> </ul>
<i>References</i> you should study to gain the knowledge you need to perform this skill:	<ul style="list-style-type: none"> <li>• <i>JMCIS/NTCS-A Users Guide Vol. I;</i> JMCIS/NTCS-A-UG-001</li> <li>• <i>JMCIS/NTCS-A Users Guide Vol. .II;</i> JMCIS/NTCS-A-UG-001</li> </ul>
<i>Exam Expectations.</i> These are subject areas you should know to help you answer exam questions correctly:	You can expect questions on operating the NTCS-A/JMCIS terminals in the participant mode.

## Advancement Handbook for FC3

General FC <i>Skill Area</i>	<b>Combat Systems Readiness Assessment</b>
A <i>skill</i> you are expected to perform from the General Skill Area above:	<b>Update combat systems smooth logs</b>
<i>Knowledge</i> you should have to perform this skill:	<ul style="list-style-type: none"> <li>• How to update combat system smooth logs</li> </ul>
<i>References</i> you should study to gain the knowledge you need to perform this skill:	<ul style="list-style-type: none"> <li>• <i>Class Combat System Doctrine;</i> COMNAVSURFLANT/ COMNAVSURFPAC INST C3516 SERIES</li> <li>• Ship's instructions</li> <li>• Ship's battle doctrine</li> </ul>
<i>Exam Expectations.</i> These are subject areas you should know to help you answer exam questions correctly:	You can expect questions on updating the combat system smooth logs and the material necessary to maintain the logs.

## Advancement Handbook for FC3

General FC <i>Skill Area</i>	<b>Electronic Systems Management</b>
A <i>skill</i> you are expected to perform from the General Skill Area above:	<b>Analyze maintenance data</b>
<i>Knowledge</i> you should have to perform this skill:	<ul style="list-style-type: none"> <li>• Contents of electronic systems maintenance data</li> <li>• How to analyze system maintenance data</li> </ul>
<i>References</i> you should study to gain the knowledge you need to perform this skill:	<ul style="list-style-type: none"> <li>• <i>Ship's Maintenance and Material Management (3-M) Manual</i>; OPNAVINST 4790.4C</li> </ul>
<i>Exam Expectations.</i> These are subject areas you should know to help you answer exam questions correctly:	You can expect questions on analyzing maintenance data.

## Advancement Handbook for FC3

General FC <i>Skill Area</i>	<b>Radar Maintenance</b>
A <i>skill</i> you are expected to perform from the General Skill Area above:	<b>Maintain antenna control systems</b>
<i>Knowledge</i> you should have to perform this skill:	<p>How to:</p> <ul style="list-style-type: none"> <li>• Clean and inspect antenna control systems</li> <li>• Troubleshoot antenna control systems</li> </ul>
<i>References</i> you should study to gain the knowledge you need to perform this skill:	<ul style="list-style-type: none"> <li>• <i>Radar Principles</i>, NAVEDTRA 172-18-00-84; (NEETS MOD 18)</li> <li>• <i>Antenna Group OE 249</i>; NAVSEA SW279-CH-AEG-010</li> <li>• <i>Signal Processor Group OL 181</i>; NAVSEA SW279-CF-AEG-010</li> <li>• MIP for the antenna controller being maintained</li> </ul>
<i>Exam Expectations.</i> These are subject areas you should know to help you answer exam questions correctly:	You can expect questions on cleaning, inspecting, and troubleshooting antenna control systems.

## Advancement Handbook for FC3

General FC <i>Skill Area</i>	<b>Radar Maintenance</b>
A <i>skill</i> you are expected to perform from the General Skill Area above:	<b>Maintain radar receivers</b>
<i>Knowledge</i> you should have to perform this skill:	<p>How to perform the following tasks on radar receivers:</p> <ul style="list-style-type: none"> <li>• Perform functional checks</li> <li>• Clean and inspect</li> <li>• Adjust and align</li> <li>• Troubleshoot</li> <li>• Replace components</li> </ul>
<i>References</i> you should study to gain the knowledge you need to perform this skill:	<ul style="list-style-type: none"> <li>• <i>AEGIS Radar AN/SPY -1D Index</i>; NAVSEA SW272-AD-AEG-010</li> <li>• <i>AEGIS Auxiliary Equipment Group for AN/SPY-1D, Description, Operation and Maintenance</i>; NAVSEA SW279-CU-AEG-010</li> </ul>
<i>Exam Expectations.</i> These are subject areas you should know to help you answer exam questions correctly:	You can expect questions on all aspects of maintaining radar receivers.

## Advancement Handbook for FC3

General FC <i>Skill Area</i>	<b>Radar Maintenance</b>
A <i>skill</i> you are expected to perform from the General Skill Area above:	<b>Maintain radar transmitters</b>
<i>Knowledge</i> you should have to perform this skill:	<p>How to perform the following tasks on radar transmitters:</p> <ul style="list-style-type: none"> <li>• Perform functional checks</li> <li>• Clean and inspect</li> <li>• Adjust and align</li> <li>• Troubleshoot</li> <li>• Replace components</li> </ul>
<i>References</i> you should study to gain the knowledge you need to perform this skill:	<ul style="list-style-type: none"> <li>• <i>AEGIS Radar AN/SPY -1D Index</i>; NAVSEA SW272-AD-AEG-010</li> <li>• <i>AEGIS Auxiliary Equipment Group for AN/SPY-1D, Description, Operation and Maintenance</i>; NAVSEA SW279-CU-AEG-010</li> </ul>
<i>Exam Expectations.</i> These are subject areas you should know to help you answer exam questions correctly:	You can expect questions on all aspects of maintaining radar transmitters.

## Advancement Handbook for FC3

General FC <i>Skill Area</i>	<b>Radar Maintenance</b>
A <i>skill</i> you are expected to perform from the General Skill Area above:	<b>Maintain trigger/pulse amplifiers</b>
<i>Knowledge</i> you should have to perform this skill:	<p>How to perform the following tasks on trigger/pulse amplifiers:</p> <ul style="list-style-type: none"> <li>• Perform functional checks</li> <li>• Clean and inspect</li> <li>• Adjust and align</li> <li>• Troubleshoot</li> <li>• Replace components</li> </ul>
<i>References</i> you should study to gain the knowledge you need to perform this skill:	<ul style="list-style-type: none"> <li>• <i>AEGIS Radar AN/SPY -1D Index</i>; NAVSEA SW272-AD-AEG-010</li> <li>• <i>AEGIS Auxiliary Equipment Group for AN/SPY-1D, Description, Operation and Maintenance</i>; NAVSEA SW279-CU-AEG-010</li> <li>• <i>Introduction to Amplifiers</i>, NAVEDTRA 172-08-00-82 (NEETS MOD 8)</li> </ul>
<i>Exam Expectations.</i> These are subject areas you should know to help you answer exam questions correctly:	You can expect questions on all aspects of maintaining trigger/pulse amplifiers.

## Advancement Handbook for FC3

General FC <i>Skill Area</i>	<b>Radar Maintenance</b>
A <i>skill</i> you are expected to perform from the General Skill Area above:	<b>Maintain klystron amplifiers</b>
<i>Knowledge</i> you should have to perform this skill:	<p>How to perform the following tasks on klystron amplifiers:</p> <ul style="list-style-type: none"> <li>• Perform functional checks</li> <li>• Adjust</li> <li>• Troubleshoot</li> <li>• Replace the entire amplifier</li> <li>• Troubleshoot the klystron tube</li> <li>• Replace the klystron tube</li> </ul>
<i>References</i> you should study to gain the knowledge you need to perform this skill:	<ul style="list-style-type: none"> <li>• <i>GMFC System MK 91</i>, NAVSEA SW261-Q2-MMO-000 series</li> <li>• <i>GMFC System MK 91</i>, NAVSEA SW261-TM-MMO-000 series</li> <li>• <i>GMFC System MK 91</i>, NAVSEA OP 4005 series</li> <li>• MIP 5ZEG000/U01-49, 5ZBAAHS/U01-77, 7112/R07-49, or associated MIP</li> </ul>
<i>Exam Expectations.</i> These are subject areas you should know to help you answer exam questions correctly:	You can expect questions on all aspects of maintaining klystron amplifiers.

## Advancement Handbook for FC3

General FC <i>Skill Area</i>	<b>Radar Maintenance</b>
A <i>skill</i> you are expected to perform from the General Skill Area above:	<b>Maintain traveling wave tube (TWT)/ magnetron amplifiers</b>
<i>Knowledge</i> you should have to perform this skill:	<p>How to perform the following tasks on TWT/ magnetron amplifiers:</p> <ul style="list-style-type: none"> <li>• Perform functional checks</li> <li>• Troubleshoot</li> <li>• Replace the entire amplifier</li> <li>• Troubleshoot TWT/magnetron tubes</li> <li>• Replace TWT/magnetron tubes</li> </ul>
<i>References</i> you should study to gain the knowledge you need to perform this skill:	<ul style="list-style-type: none"> <li>• FCS MK 99; NAVSEA SE140-AG-AEG-000</li> <li>• MIP 4829/001-49, 4821/004-49, 5ZEBAAF/U01-49, or associated MIP</li> </ul>
<i>Exam Expectations.</i> These are subject areas you should know to help you answer exam questions correctly:	You can expect questions on all aspects of maintaining TWT/magnetron tubes.

## Advancement Handbook for FC3

General FC <i>Skill Area</i>	<b>Radar System Maintenance</b>
A <i>skill</i> you are expected to perform from the General Skill Area above:	<b>Maintain rectifier units</b>
<i>Knowledge</i> you should have to perform this skill:	<p>How to perform the following tasks on rectifier units:</p> <ul style="list-style-type: none"> <li>• Perform functional checks</li> <li>• Clean and inspect</li> <li>• Adjust</li> <li>• Troubleshoot</li> <li>• Replace components</li> </ul>
<i>References</i> you should study to gain the knowledge you need to perform this skill:	<ul style="list-style-type: none"> <li>• FCS MK 99; NAVSEA SW271-B1-AEG-010</li> <li>• Radar equipment manuals</li> <li>• MIP 3140/R51-39 or associated MIP</li> </ul>
<i>Exam Expectations.</i> These are subject areas you should know to help you answer exam questions correctly:	You can expect questions on all aspects of maintaining rectifier units.

## Advancement Handbook for FC3

General FC <i>Skill Area</i>	<b>Radar Maintenance</b>
A <i>skill</i> you are expected to perform from the General Skill Area above:	<b>Maintain radomes</b>
<i>Knowledge</i> you should have to perform this skill:	How to perform the following tasks on radomes: <ul style="list-style-type: none"> <li>• Clean and inspect</li> <li>• Replace components</li> </ul>
<i>References</i> you should study to gain the knowledge you need to perform this skill:	<ul style="list-style-type: none"> <li>• <i>GFCS MK 86</i>; NAVSEA SW235-C9-MMO-010/040/110</li> <li>• MIP 4818/012-49, 4829/001-49, 4821/004-49, 5ZEBAAF/U01-49, or associated MIP</li> </ul>
<i>Exam Expectations.</i> These are subject areas you should know to help you answer exam questions correctly:	You can expect questions on all aspects of maintaining radomes.

## Advancement Handbook for FC3

General FC <i>Skill Area</i>	<b>Radar Maintenance</b>
A <i>skill</i> you are expected to perform from the General Skill Area above:	<b>Maintain radar antennas</b>
<i>Knowledge</i> you should have to perform this skill:	<p>How to perform the following tasks on radar antennas:</p> <ul style="list-style-type: none"> <li>• Perform functional checks</li> <li>• Clean and inspect</li> <li>• Adjust and align</li> <li>• Troubleshoot</li> <li>• Replace the antenna</li> </ul>
<i>References</i> you should study to gain the knowledge you need to perform this skill:	<ul style="list-style-type: none"> <li>• <i>AEGIS Radar AN/SPY -1D Index</i>; NAVSEA SW272-AD-AEG-010</li> <li>• <i>AEGIS Auxiliary Equipment Group for AN/SPY-1D, Description, Operation and Maintenance</i>; NAVSEA SW279-CU-AEG-010</li> </ul>
<i>Exam Expectations.</i> These are subject areas you should know to help you answer exam questions correctly:	You can expect questions on all aspects of maintaining radar antennas.

## Advancement Handbook for FC3

General FC <i>Skill Area</i>	<b>Radar Maintenance</b>
A <i>skill</i> you are expected to perform from the General Skill Area above:	<b>Maintain stabilization equipment</b>
<i>Knowledge</i> you should have to perform this skill:	<p>How to perform the following tasks on stabilization equipment:</p> <ul style="list-style-type: none"> <li>• Perform functional checks</li> <li>• Clean and inspect</li> <li>• Lubricate</li> <li>• Adjust and align</li> </ul>
<i>References</i> you should study to gain the knowledge you need to perform this skill:	<ul style="list-style-type: none"> <li>• <i>AEGIS Radar AN/SPY -1D Index</i>; NAVSEA SW272-AD-AEG-010</li> <li>• <i>AEGIS Auxiliary Equipment Group for AN/SPY-1D, Description, Operation and Maintenance</i>; NAVSEA SW279-CU-AEG-010</li> </ul>
<i>Exam Expectations.</i> These are subject areas you should know to help you answer exam questions correctly:	You can expect questions on all aspects of maintaining stabilization equipment.

## Advancement Handbook for FC3

General FC <i>Skill Area</i>	<b>Radar Maintenance</b>
A <i>skill</i> you are expected to perform from the General Skill Area above:	<b>Maintain elevation and train motors</b>
<i>Knowledge</i> you should have to perform this skill:	<p>How to perform the following tasks on elevation and train motors:</p> <ul style="list-style-type: none"> <li>• Perform functional checks</li> <li>• Clean and inspect</li> <li>• Lubricate</li> <li>• Replace components</li> </ul>
<i>References</i> you should study to gain the knowledge you need to perform this skill:	<ul style="list-style-type: none"> <li>• <i>FCS MK 99</i>; NAVSEA SW271-B1-AEG-010</li> <li>• MIP 3140/R51-39, 4829/001-49, 4821/004-49, 5ZEBAAF/U01-49, or associated MIP</li> </ul>
<i>Exam Expectations.</i> These are subject areas you should know to help you answer exam questions correctly:	You can expect questions on all aspects of maintaining elevation and train motors.

## Part 2

### Advancement Handbook for FC2

## Advancement Handbook for FC2

General FC <i>Skill Area</i>	<b>Electrical/Electronic Maintenance</b>
A <i>skill</i> you are expected to perform from the General Skill Area above:	<b>Identify EMI and RFI</b>
<i>Knowledge</i> you should have to perform this skill:	How to: <ul style="list-style-type: none"> <li>• Identify EMI</li> <li>• Identify RFI</li> </ul>
<i>References</i> you should study to gain the knowledge you need to perform this skill:	<ul style="list-style-type: none"> <li>• <i>Introduction to Wave-Propagation, Transmission Lines, and Antennas</i>, NAVEDTRA B72-10-00-93; (NEETS MOD 10)</li> <li>• <i>Industrial Electromagnetic Compatibility (IEMC) Work Process Instructions</i>, NAVSEA STD-407-5287561</li> </ul>
<i>Exam Expectations.</i> These are subject areas you should know to help you answer exam questions correctly:	You can expect questions on identifying EMI and RFI.

## Advancement Handbook for FC2

General FC <i>Skill Area</i>	<b>Electrical/Electronic Maintenance</b>
A <i>skill</i> you are expected to perform from the General Skill Area above:	<b>Make electrical connections (wire wrap, termi-point, crimp, etc.)</b>
<i>Knowledge</i> you should have to perform this skill:	<p>How to:</p> <ul style="list-style-type: none"> <li>• Create various connections (wire wrap, termi-point, crimp, etc.)</li> <li>• Insert and extract connector pins</li> </ul>
<i>References</i> you should study to gain the knowledge you need to perform this skill:	<ul style="list-style-type: none"> <li>• <i>Navy Installation and Maintenance Book (NIMB) Installation Standards</i>, NAVSEA SE000-01-IMB-010</li> <li>• <i>Introduction to Alternating Current and Transformers</i>, NAVEDTRA 172-02-00-91; (NEETS MOD 2)</li> <li>• <i>Introduction to Test Equipment</i>, NAVEDTRA B72-16-00-96; (NEETS MOD 16)</li> </ul>
<i>Exam Expectations.</i> These are subject areas you should know to help you answer exam questions correctly:	You can expect questions on making wire wrap, termi-point, and crimp connections. Also on inserting and extracting connector pins.

## Advancement Handbook for FC2

General FC <i>Skill Area</i>	<b>Electrical/Electronic Maintenance</b>
A <i>skill</i> you are expected to perform from the General Skill Area above:	<b>Install equipment field changes</b>
<i>Knowledge</i> you should have to perform this skill:	How to: <ul style="list-style-type: none"><li>• Install equipment field changes</li></ul>
<i>References</i> you should study to gain the knowledge you need to perform this skill:	<ul style="list-style-type: none"><li>• <i>Ship's Maintenance and Material Management (3-M) Manual</i>, OPNAVINST 4790.4C CH 10</li></ul>
<i>Exam Expectations.</i> These are subject areas you should know to help you answer exam questions correctly:	You can expect questions on installing equipment field changes.

## Advancement Handbook for FC2

General FC <i>Skill Area</i>	<b>Electrical/Electronic Maintenance</b>
A <i>skill</i> you are expected to perform from the General Skill Area above:	<b>Test and inspect fiber optics</b>
<i>Knowledge</i> you should have to perform this skill:	How to: <ul style="list-style-type: none"> <li>• Test and inspect fiber optics</li> </ul>
<i>References</i> you should study to gain the knowledge you need to perform this skill:	<ul style="list-style-type: none"> <li>• <i>Introduction to Fiber Optics</i>, NAVEDTRA B72-24-00-92; (NEETS MOD 24)</li> <li>• NSTM Chapter 408; <i>Fiber Optic Topology, Operation, Maintenance, and Repair</i>, NAVSEA S9086-PF-STM-010</li> </ul>
<i>Exam Expectations.</i> These are subject areas you should know to help you answer exam questions correctly:	You can expect questions on testing and inspecting fiber optics.

## Advancement Handbook for FC2

General FC <i>Skill Area</i>	<b>Computer and Peripheral Maintenance</b>
A <i>skill</i> you are expected to perform from the General Skill Area above:	<b>Maintain printers and plotters</b>
<i>Knowledge</i> you should have to perform this skill:	<p>How to perform the following tasks on printers and plotters:</p> <ul style="list-style-type: none"> <li>• Perform functional checks</li> <li>• Lubricate</li> <li>• Adjust and align</li> <li>• Replace components</li> </ul>
<i>References</i> you should study to gain the knowledge you need to perform this skill:	<ul style="list-style-type: none"> <li>• <i>Xerox Printer/Plotter 72A, NAVSEA SW282-E6-AEG-010</i></li> <li>• <i>Xerox Controller 190, NAVSEA SW282-E6-AEG-010</i></li> <li>• MIP 4953/500 (series)</li> </ul>
<i>Exam Expectations.</i> These are subject areas you should know to help you answer exam questions correctly:	You can expect questions on all aspects of maintaining printers and plotters.

## Advancement Handbook for FC2

General FC <i>Skill Area</i>	<b>Computer and Peripheral Maintenance</b>
A <i>skill</i> you are expected to perform from the General Skill Area above:	<b>Maintain data multiplexers</b>
<i>Knowledge</i> you should have to perform this skill:	<p>How to perform the following tasks on data multiplexers:</p> <ul style="list-style-type: none"> <li>• Perform functional checks</li> <li>• Clean and inspect</li> <li>• Adjust</li> <li>• Troubleshoot</li> <li>• Replace components</li> </ul>
<i>References</i> you should study to gain the knowledge you need to perform this skill:	<ul style="list-style-type: none"> <li>• <i>DDI Terminal IP 1243 and Control Multiplexer TD-1194</i>; NAVSEA 686-AK-MMO-010</li> <li>• <i>Multiplexer/Demultiplexer TD 1389 Operational Manual</i>; NAVSEA EE163-MG-OPI-010</li> <li>• <i>Multiplexer/Demultiplexer TD 1389 Maintenance Manual</i>; NAVSEA EE163-MH-MMI-010</li> </ul>
<i>Exam Expectations.</i> These are subject areas you should know to help you answer exam questions correctly:	You can expect questions on all aspects of maintaining data multiplexers.

## Advancement Handbook for FC2

General FC <i>Skill Area</i>	<b>Weapons Handling/Maintenance</b>
A <i>skill</i> you are expected to perform from the General Skill Area above:	<b>Perform weapons maintenance procedures</b>
<i>Knowledge</i> you should have to perform this skill:	How to: <ul style="list-style-type: none"> <li>• Inspect handling equipment</li> <li>• Inspect missile connections, fittings, and matting surfaces</li> </ul>
<i>References</i> you should study to gain the knowledge you need to perform this skill:	<ul style="list-style-type: none"> <li>• <i>Approved Handling Equipment for Weapons and Explosives</i>; NAVSEA OP 2173</li> <li>• <i>USN Ordnance Safety Precautions</i>; NAVSEA OP 3347</li> <li>• <i>NSTM Chapter 700 Shipboard Ammunition Handling and Stowage</i>; NAVSEA S9086-XG-STM-010</li> <li>• <i>Cable and Connector Repair</i>, NAVSEA OD 45879</li> </ul>
<i>Exam Expectations.</i> These are subject areas you should know to help you answer exam questions correctly:	You can expect questions on inspecting handling equipment and missile connections, fittings, and matting surfaces.

## Part 3

### Advancement Handbook for FC1

## Advancement Handbook for FC1

General FC <i>Skill Area</i>	<b>Computer and Peripheral Maintenance</b>
A <i>skill</i> you are expected to perform from the General Skill Area above:	<b>Oversee OCSOT testing</b>
<i>Knowledge</i> you should have to perform this skill:	How to: <ul style="list-style-type: none"><li>• Coordinate OCSOT testing</li><li>• Direct OCSOT</li><li>• Analyze OCSOT results</li></ul>
<i>References</i> you should study to gain the knowledge you need to perform this skill:	<ul style="list-style-type: none"><li>• MIP 8443 series for OCSOT</li><li>• Computer Program Design Specification</li><li>• Program Performance Specification</li></ul>
<i>Exam Expectations.</i> These are subject areas you should know to help you answer exam questions correctly:	You can expect questions on managing OCSOT operations

## Advancement Handbook for FC1

General FC <i>Skill Area</i>	<b>Computer and Peripheral Maintenance</b>
A <i>skill</i> you are expected to perform from the General Skill Area above:	<b>Oversee POFA</b>
<i>Knowledge</i> you should have to perform this skill:	<p>How to:</p> <ul style="list-style-type: none"> <li>• Direct POFA</li> <li>• Coordinate POFA between departments and divisions</li> <li>• Evaluate results of POFA</li> </ul>
<i>References</i> you should study to gain the knowledge you need to perform this skill:	<ul style="list-style-type: none"> <li>• <i>POFA LINK 11</i></li> <li>• <i>POFA LINK4A</i></li> <li>• <i>POFA SLQ-32</i></li> <li>• <i>POFA Intercomputer</i></li> <li>• <i>POFA KCMX</i></li> <li>• Computer program design specification</li> <li>• Program performance specification</li> <li>• MIP 8443/507-29, 8443/001-B1, or associated MIP</li> </ul>
<i>Exam Expectations.</i> These are subject areas you should know to help you answer exam questions correctly:	You can expect questions on managing POFA operations

## Advancement Handbook for FC1

General FC <i>Skill Area</i>	<b>Combat Directions / Weapons Direction / Fire-Control System Operations</b>
A <i>skill</i> you are expected to perform from the General Skill Area above:	<b>Verify target</b>
<i>Knowledge</i> you should have to perform this skill:	How to: <ul style="list-style-type: none"> <li>• Identify hostile intent</li> <li>• Evaluate IFF response</li> </ul>
<i>References</i> you should study to gain the knowledge you need to perform this skill:	<ul style="list-style-type: none"> <li>• <i>Allied Maritime Tactical Instructions and Procedures</i>, Allied Tactical Publication; ATP 1, Vol. 1; Ch. 7</li> <li>• <i>Antiair Warfare</i>; NWP 3-01.01; Ch. 3, 4, App E</li> <li>• QRG for RSC, CSC, MSS, TWS, WCC-1 and WCC-2</li> </ul>
<i>Exam Expectations.</i> These are subject areas you should know to help you answer exam questions correctly:	You can expect questions on verifying hostile intent on target information.

## Advancement Handbook for FC1

General FC <i>Skill Area</i>	<b>Combat Systems Readiness Assessment</b>
A <i>skill</i> you are expected to perform from the General Skill Area above:	<b>Schedule combat system watch teams</b>
<i>Knowledge</i> you should have to perform this skill:	<ul style="list-style-type: none"> <li>• Requirements for and composition of combat system watch teams</li> <li>• Schedule combat system watch teams</li> </ul>
<i>References</i> you should study to gain the knowledge you need to perform this skill:	<ul style="list-style-type: none"> <li>• <i>Class Combat System Doctrine;</i> COMNAVSURFLANT/COMNAVSURFPAC INST C3516 SERIES</li> <li>• Ship's instructions</li> <li>• Ship's battle doctrine</li> </ul>
<i>Exam Expectations.</i> These are subject areas you should know to help you answer exam questions correctly:	You can expect questions on the composition and scheduling of combat system watch teams.

## Advancement Handbook for FC1

General FC <i>Skill Area</i>	<b>Combat System Readiness Assessment</b>
<i>A skill</i> you are expected to perform from the General Skill Area above:	<b>Schedule combat system maintenance and testing</b>
<i>Knowledge</i> you should have to perform this skill:	How to: <ul style="list-style-type: none"> <li>• Coordinate OCSOT testing</li> <li>• Direct OCSOT</li> <li>• Analyze OCSOT results</li> </ul>
<i>References</i> you should study to gain the knowledge you need to perform this skill:	<ul style="list-style-type: none"> <li>• MIP 8443 series for OCSOT</li> <li>• Computer Program Design Specification</li> <li>• Program Performance Specification</li> <li>• <i>Ship's Maintenance and Material Management (3-M) Manual</i>; OPNAVINST 4790.4C</li> </ul>
<i>Exam Expectations.</i> These are subject areas you should know to help you answer exam questions correctly:	You can expect questions on managing maintenance and testing of combat system equipment.

## Advancement Handbook for FC1

General FC <i>Skill Area</i>	<b>Combat System Readiness Assessment</b>
A <i>skill</i> you are expected to perform from the General Skill Area above:	<b>Evaluate Combat Systems Operating Sequencing System (CSOSS) procedures and doctrine for ship's class and type</b>
<i>Knowledge</i> you should have to perform this skill:	<ul style="list-style-type: none"> <li>• CSOSS procedures</li> <li>• CSOSS doctrine</li> <li>• How to evaluate Combat Systems Operating Sequencing System (CSOSS) procedures and doctrine for ship's class and type</li> </ul>
<i>References</i> you should study to gain the knowledge you need to perform this skill:	<ul style="list-style-type: none"> <li>• CSOSS Book 1 series, 2, 3, 4, 5, and 6</li> </ul>
<i>Exam Expectations.</i> These are subject areas you should know to help you answer exam questions correctly:	You can expect questions on evaluating combat Systems Operating Sequencing System (CSOSS) procedures and doctrine for your ship's class and type.

## Advancement Handbook for FC1

General FC <i>Skill Area</i>	<b>Combat System Readiness Assessment</b>
A <i>skill</i> you are expected to perform from the General Skill Area above:	<b>Evaluate CSOSS drills</b>
<i>Knowledge</i> you should have to perform this skill:	How to: <ul style="list-style-type: none"><li>• Conduct CSOSS drills</li><li>• Evaluate CSOSS drills</li></ul>
<i>References</i> you should study to gain the knowledge you need to perform this skill:	<ul style="list-style-type: none"><li>• CSOSS Book 4</li></ul>
<i>Exam Expectations.</i> These are subject areas you should know to help you answer exam questions correctly:	You can expect questions on conducting and evaluating CSOSS drills.

## Advancement Handbook for FC1

General FC <i>Skill Area</i>	<b>Electronic System Management</b>
A <i>skill</i> you are expected to perform from the General Skill Area above:	<b>Change combinations (cipher locks, safes, etc.)</b>
<i>Knowledge</i> you should have to perform this skill:	<ul style="list-style-type: none"> <li>• Requirements for changing combinations</li> <li>• How to change combinations</li> </ul>
<i>References</i> you should study to gain the knowledge you need to perform this skill:	<ul style="list-style-type: none"> <li>• <i>Department of the Navy Information Security Program (ISP) Regulation; SECNAVINST 5510.36</i></li> </ul>
<i>Exam Expectations.</i> These are subject areas you should know to help you answer exam questions correctly:	You can expect questions on the requirements and procedures for changing combinations.

## Advancement Handbook for FC1

General FC <i>Skill Area</i>	<b>Electronic System Management</b>
A <i>skill</i> you are expected to perform from the General Skill Area above:	<b>Update access lists</b>
<i>Knowledge</i> you should have to perform this skill:	<ul style="list-style-type: none"><li>• Requirements for updating access lists</li><li>• Procedure for updating access lists</li></ul>
<i>References</i> you should study to gain the knowledge you need to perform this skill:	<ul style="list-style-type: none"><li>• <i>Department of the Navy (DON) Information Security Program (ISP) Regulation; SECNAVINST 5510.36</i></li></ul>
<i>Exam Expectations.</i> These are subject areas you should know to help you answer exam questions correctly:	You can expect questions on updating access lists.

## Part 4

### Advancement Handbook for FCC

## Advancement Handbook for FCC

General FC <i>Skill Area</i>	<b>Combat Directions / Weapons Direction / Fire-Control System Maintenance</b>
A <i>skill</i> you are expected to perform from the General Skill Area above:	<b>Oversee battery alignment procedures</b>
<i>Knowledge</i> you should have to perform this skill:	<p>How to:</p> <ul style="list-style-type: none"> <li>• Coordinate battery alignment</li> <li>• Monitor battery alignment measurements, computations, and corrections</li> <li>• Analyze radar collimation data</li> <li>• Evaluate battery alignment results</li> </ul>
<i>References</i> you should study to gain the knowledge you need to perform this skill:	<ul style="list-style-type: none"> <li>• <i>Theory of Combat System Alignment</i>; NAVSEA SW225-AO-MMA-010</li> <li>• <i>Combat System Alignment Manual</i>; NAVSEA SW225-CL-CSA-010</li> <li>• <i>Principles of Synchros, Servos, and Gyros</i>; NAVEDTRA B72-15-00-93; (NEETS MOD 15)</li> <li>• <i>Introduction to Test Equipment</i>; NAVEDTRA B72-16-00-96; (NEETS MOD 16)</li> </ul>
<i>Exam Expectations.</i> These are subject areas you should know to help you answer exam questions correctly:	You can expect questions on all aspects of battery alignment.

## Advancement Handbook for FCC

General FC <i>Skill Area</i>	<b>Combat System / Weapons Direction / Fire Control Systems Operations</b>
A <i>skill</i> you are expected to perform from the General Skill Area above:	<b>Resolve correlation conflicts</b>
<i>Knowledge</i> you should have to perform this skill:	<ul style="list-style-type: none"> <li>• How to resolve correlation conflicts</li> </ul>
<i>References</i> you should study to gain the knowledge you need to perform this skill:	<ul style="list-style-type: none"> <li>• <i>Allied Maritime Tactical Instructions and Procedures</i>; Allied Tactical Publication, ATP 1, Vol. 1; Ch. 5, 8, 9, 10</li> <li>• <i>Surface Ship Passive Localization and Target Motion Analysis</i>; NWP 3-21.51.3; Ch. 4, 6, App A</li> <li>• <i>CSOSS Book 10 &amp; 14</i></li> </ul>
<i>Exam Expectations.</i> These are subject areas you should know to help you answer exam questions correctly:	You can expect questions on resolving correlation conflicts.

## Advancement Handbook for FCC

General FC <i>Skill Area</i>	<b>Combat Directions / Weapons Directions / Fire Control Systems Operations</b>
A <i>skill</i> you are expected to perform from the General Skill Area above:	<b>Modify weapons and target pairing</b>
<i>Knowledge</i> you should have to perform this skill:	<ul style="list-style-type: none"> <li>• Weapon and target characteristics</li> <li>• How to modify weapons and target pairing</li> </ul>
<i>References</i> you should study to gain the knowledge you need to perform this skill:	<ul style="list-style-type: none"> <li>• <i>Class Combat Doctrine</i>; COMNAVSURFLANT/COMNAVSURFPAC INSTRUCTION C3516 Series</li> <li>• <i>Surface Force Training Manual</i>; COMNAVSURFLANT/COMNAVSURFPAC INSTRUCTION C3502.2</li> <li>• <i>Coordinator's Operating Procedures (Doctrine Application)</i>; NAVSEA S9410-AM-AEG-040/(C)</li> </ul>
<i>Exam Expectations.</i> These are subject areas you should know to help you answer exam questions correctly:	You can expect questions on modifying weapons and target pairing

## Advancement Handbook for FCC

General FC <i>Skill Area</i>	<b>Combat Systems Readiness Assessment</b>
A <i>skill</i> you are expected to perform from the General Skill Area above:	<b>Analyze operational failures (tactical)</b>
<i>Knowledge</i> you should have to perform this skill:	<ul style="list-style-type: none"> <li>• How to analyze operational failures</li> </ul>
<i>References</i> you should study to gain the knowledge you need to perform this skill:	<ul style="list-style-type: none"> <li>• CSTOM <i>Index</i>; NAVSEA S9CGO-BR-CSM-010</li> <li>• CSTOM <i>Introduction to CSTOM</i>; NAVSEA S9CGO-BR-CSM-020</li> <li>• CSTOM <i>Element Description</i>; NAVSEA S9CGO-BR-CSM-030</li> <li>• CSTOM <i>Fault Isolation</i>; NAVSEA S9CGO-BR-CSM-070</li> <li>• CSTOM <i>Fault Isolation</i>; NAVSEA S9CGO-BR-CSM-080</li> <li>• CSTOM <i>Fault Isolation</i>; NAVSEA S9CGO-BR-CSM-090</li> <li>• CSTOM <i>Fault Isolation</i>; NAVSEA S9CGO-BR-CSM-100</li> <li>• CSTOM <i>Secret Supplement</i>; NAVSEA S9CGO-BR-CSM-110/(S)</li> <li>• CSTOMs for your platform</li> <li>• TDMIS report</li> </ul>
<i>Exam Expectations.</i> These are subject areas you should know to help you answer exam questions correctly:	You can expect questions on analyzing operational failures.

## Advancement Handbook for FCC

General FC <i>Skill Area</i>	<b>Combat Systems Readiness Assessment</b>
A <i>skill</i> you are expected to perform from the General Skill Area above:	<b>Organize Combat Systems Watch Teams</b>
<i>Knowledge</i> you should have to perform this skill:	<ul style="list-style-type: none"> <li>• Combat system watch team requirements and composition</li> <li>• How to organize combat system watch teams</li> </ul>
<i>References</i> you should study to gain the knowledge you need to perform this skill:	<ul style="list-style-type: none"> <li>• <i>Class Combat System Doctrine;</i> COMNAVSURFLANT/COMNAVSURFPAC INST C3516 Series</li> <li>• Ship's instructions</li> <li>• Ship's battle doctrine</li> </ul>
<i>Exam Expectations.</i> These are subject areas you should know to help you answer exam questions correctly:	You can expect questions on organizing the combat system watch teams.

## Advancement Handbook for FCC

General FC <i>Skill Area</i>	<b>Combat System Readiness Assessment</b>
A <i>skill</i> you are expected to perform from the General Skill Area above:	<b>Evaluate combat systems readiness</b>
<i>Knowledge</i> you should have to perform this skill:	How to: <ul style="list-style-type: none"><li>• Evaluate combat system readiness</li><li>• Provide recommendations on capability and reliability of degraded systems</li></ul>
<i>References</i> you should study to gain the knowledge you need to perform this skill:	<ul style="list-style-type: none"><li>• Associated MIP 8443 series for OCSOT, POFA, and CSAT</li><li>• CSTOM CAPS/LIMS</li><li>• CSOSS Book 10 and 14</li><li>• NWP 3-01.10</li></ul>
<i>Exam Expectations.</i> These are subject areas you should know to help you answer exam questions correctly:	You can expect questions on evaluating combat system readiness postures, capabilities, and limitations.

## Advancement Handbook for FCC

General FC <i>Skill Area</i>	<b>Combat Systems Readiness Assessment</b>
A <i>skill</i> you are expected to perform from the General Skill Area above:	<b>Make recommendations on the capability and reliability of a degraded system</b>
<i>Knowledge</i> you should have to perform this skill:	How to: <ul style="list-style-type: none"> <li>• Analyze operational failures</li> <li>• Determine the capabilities and reliabilities of degraded equipment</li> </ul>
<i>References</i> you should study to gain the knowledge you need to perform this skill:	<ul style="list-style-type: none"> <li>• CAPS/LIMS for your platform i.e.</li> <li>• CSTOM <i>Index</i>; NAVSEA S9CGO-BR-CSM-010</li> <li>• CSTOM <i>Introduction to CSTOM</i>; NAVSEA S9CGO-BR-CSM-020</li> <li>• CSTOM <i>Element Description</i>; NAVSEA S9CGO-BR-CSM-030</li> <li>• CSTOM <i>Fault Isolation</i>; NAVSEA S9CGO-BR-CSM-070/080/090/100</li> <li>• CSTOM <i>Secret Supplement</i>; NAVSEA S9CGO-BR-CSM-110/(S)</li> </ul>
<i>Exam Expectations.</i> These are subject areas you should know to help you answer exam questions correctly:	You can expect questions on analyzing operational failures.

## Advancement Handbook for FCC

General FC <i>Skill Area</i>	<b>Combat System Readiness Assessment</b>
A <i>skill</i> you are expected to perform from the General Skill Area above:	<b>Audit weapon logs and firing report smooth logs</b>
<i>Knowledge</i> you should have to perform this skill:	<ul style="list-style-type: none"> <li>• Weapon log contents</li> <li>• Firing report smooth log contents</li> <li>• How to audit weapon logs and firing report smooth logs.</li> </ul>
<i>References</i> you should study to gain the knowledge you need to perform this skill:	<ul style="list-style-type: none"> <li>• <i>Class Combat Doctrine</i>; COMNAVSURFLANT/COMNAVSURFPAC INSTRUCTION C3516 Series</li> <li>• <i>Surface Force Training Manual</i>; COMNAVSURFLANT/COMNAVSURFPAC INSTRUCTION C3502.2</li> <li>• Ship's instructions</li> </ul>
<i>Exam Expectations.</i> These are subject areas you should know to help you answer exam questions correctly:	You can expect questions on auditing weapon logs and firing report smooth logs.

## Advancement Handbook for FCC

General FC <i>Skill Area</i>	<b>Combat System Readiness Assessment</b>
<i>A skill</i> you are expected to perform from the General Skill Area above:	<b>Conduct CSOSS drills</b>
<i>Knowledge</i> you should have to perform this skill:	How to: <ul style="list-style-type: none"><li>• Conduct CSOSS drills</li><li>• Evaluate CSOSS drills</li></ul>
<i>References</i> you should study to gain the knowledge you need to perform this skill:	<ul style="list-style-type: none"><li>• CSOSS, Book 4</li></ul>
<i>Exam Expectations.</i> These are subject areas you should know to help you answer exam questions correctly:	You can expect questions on conducting and evaluating CSOSS drills.

## Advancement Handbook for FCC

General FC <i>Skill Area</i>	<b>Electronic Systems Management</b>
A <i>skill</i> you are expected to perform from the General Skill Area above:	<b>Prepare and review casualty reports (CASREPs)</b>
<i>Knowledge</i> you should have to perform this skill:	How to: <ul style="list-style-type: none"> <li>• Prepare casualty reports</li> <li>• Review casualty reports</li> </ul>
<i>References</i> you should study to gain the knowledge you need to perform this skill:	<ul style="list-style-type: none"> <li>• <i>Ships' Maintenance and Material Management (3-M) Manual</i>; OPNAVINST 4790.4C</li> <li>• <i>Special Incident Reporting (OPREP-3, Navy Blue, and Unit SITREP) Procedures</i>, OPNAVINST 3100.6</li> </ul>
<i>Exam Expectations.</i> These are subject areas you should know to help you answer exam questions correctly:	You can expect questions on preparing and reviewing casualty reports.

## Advancement Handbook for FCC

General FC <i>Skill Area</i>	<b>Electronic Systems Management</b>
A <i>skill</i> you are expected to perform from the General Skill Area above:	<b>Prepare and review casualty updates</b>
<i>Knowledge</i> you should have to perform this skill:	How to: <ul style="list-style-type: none"> <li>• Prepare casualty updates</li> <li>• Review casualty updates</li> </ul>
<i>References</i> you should study to gain the knowledge you need to perform this skill:	<ul style="list-style-type: none"> <li>• <i>Ships' Maintenance and Material Management (3-M) Manual</i>; OPNAVINST 4790.4C</li> <li>• <i>Special Incident Reporting (OPREP-3, Navy Blue, and Unit SITREP) Procedures</i>, OPNAVINST 3100.6</li> </ul>
<i>Exam Expectations.</i> These are subject areas you should know to help you answer exam questions correctly:	You can expect questions on preparing and reviewing casualty updates.

## Advancement Handbook for FCC

General FC <i>Skill Area</i>	<b>Electronic Systems Management</b>
A <i>skill</i> you are expected to perform from the General Skill Area above:	<b>Prepare and review casualty corrections (CASCOR) reports</b>
<i>Knowledge</i> you should have to perform this skill:	How to: <ul style="list-style-type: none"> <li>• Prepare casualty corrections reports</li> <li>• Review casualty corrections reports</li> </ul>
<i>References</i> you should study to gain the knowledge you need to perform this skill:	<ul style="list-style-type: none"> <li>• <i>Ships' Maintenance and Material Management (3-M) Manual</i>; OPNAVINST 4790.4C</li> <li>• <i>Special Incident Reporting (OPREP-3, Navy Blue, and Unit SITREP) Procedures</i>, OPNAVINST 3100.6</li> </ul>
<i>Exam Expectations.</i> These are subject areas you should know to help you answer exam questions correctly:	You can expect questions on preparing and reviewing casualty correction reports.

## Advancement Handbook for FCC

General FC <i>Skill Area</i>	<b>Electronic Systems Management</b>
A <i>skill</i> you are expected to perform from the General Skill Area above:	<b>Prepare and review casualty canceled (CASCAN) reports</b>
<i>Knowledge</i> you should have to perform this skill:	How to: <ul style="list-style-type: none"> <li>• Prepare casualty canceled reports</li> <li>• Review casualty canceled reports</li> </ul>
<i>References</i> you should study to gain the knowledge you need to perform this skill:	<ul style="list-style-type: none"> <li>• <i>Ships' Maintenance and Material Management (3-M) Manual</i>; OPNAVINST 4790.4C</li> <li>• <i>Special Incident Reporting (OPREP-3, Navy Blue, and Unit SITREP) Procedures</i>, OPNAVINST 3100.6</li> </ul>
<i>Exam Expectations.</i> These are subject areas you should know to help you answer exam questions correctly:	You can expect questions on preparing and reviewing casualty canceled reports.

## Advancement Handbook for FCC

General FC <i>Skill Area</i>	<b>Electronic Systems Management</b>
A <i>skill</i> you are expected to perform from the General Skill Area above:	<b>Evaluate inadequacies in operational programs and maintenance programs</b>
<i>Knowledge</i> you should have to perform this skill:	<ul style="list-style-type: none"> <li>• Operational and maintenance program requirements</li> <li>• How to evaluate inadequacies in operational and maintenance programs</li> </ul>
<i>References</i> you should study to gain the knowledge you need to perform this skill:	<ul style="list-style-type: none"> <li>• <i>Department of the Navy Information Security Program (ISP) Regulation; SECNAVINST 5510.36</i></li> <li>• <i>Department of the Navy Personnel Security Program; SECNAVINST 5510.30A</i></li> <li>• Ship's instructions</li> </ul>
<i>Exam Expectations.</i> These are subject areas you should know to help you answer exam questions correctly:	You can expect questions on evaluating inadequacies of operational and maintenance programs.

## Advancement Handbook for FCC

General FC <i>Skill Area</i>	<b>Electronic System Management</b>
A <i>skill</i> you are expected to perform from the General Skill Area above:	<b>Review/document ship materiel changes</b>
<i>Knowledge</i> you should have to perform this skill:	<p>Requirements for and contents of:</p> <ul style="list-style-type: none"> <li>• Ship overhaul work packages</li> <li>• SHIPALT packages</li> <li>• Engineering change proposals (ECP)</li> <li>• System audits (field changes, SHIPALTS, etc.)</li> </ul>
<i>References</i> you should study to gain the knowledge you need to perform this skill:	<ul style="list-style-type: none"> <li>• <i>Ships Maintenance and Material Management (3-M) Manual</i>; OPNAVINST 4790.4C</li> <li>• <i>Navy Occupational Safety and Health Program Manual (Afloat)</i>; OPNAVINST 5100.19C Vol. 1</li> </ul>
<i>Exam Expectations.</i> These are subject areas you should know to help you answer exam questions correctly:	You can expect questions on reviewing or documenting ship materiel changes.

## Appendix 1

### References Used in This Advancement Handbook

The references used to develop the Fire Controlman Advancement Handbook are listed below. These references will also be used to develop the advancement exams. In a few circumstances, a publication not listed below may be used in exam development but this will be kept to a minimum. To prepare for a particular exam, always refer to the specific bibliography for that exam as you study.

<b>Short Title</b>	<b>Long Title</b>	<b>Stocking Point</b>
ACD 3106B	User's Manual for AEGIS Tactical Executive System (ATES/43)	Note 1
ACD 3296	User's Manual for Tactical Utilities Function (TUF)	Note 1
ACP 125E	Radiotelephone Procedures for Conduct of Artillery and Naval Gunfire	Note 1
ACP 160	IFF/SIF Operational Procedures	Note 1
ADATP 11	Allied Data Processing Publication 11 Standard Operating Procedures for NATO Link 11	Note 1
ANSI/IEEE STD 100-1988	Standard Dictionary of Electrical and Electronic Terms	Note 1
ATP 1C	Allied Maritime Tactical Instructions and Procedures	Note 1
ATP 4	Allied Spotting Procedures for Naval Gunfire Support	Note 1
CDRL A114	UNISYS AN/UYK-43 Abbreviated Reference Manual	Note 1
CDRL J016	AEGIS Guided Missile Cruiser (CG65-67) Combat Systems Configuration Definition Document	Note 1
COMNAVSURFLANT/ COMNAVSURFPAC INST 3502.2	Surface Force Training Manual	Note 13
COMNAVSURFLANT/ COMNAVSURFPAC INSTRUCTION C3516 SERIES COMINWARCOMINST C3516.1	Class Combat System Doctrine	Note 6
CMS 1	Communications Security Material System (CMS) Policy and Instructions	Note 16
CSOSS Book 1.1	Master Set – Procedures and Diagrams (CS)	Note 15
CSOSS Book 1.2	Master Set – Procedures and Diagrams (SPY-FCS)	Note 15
CSOSS Book 1.3	Master Set – Procedures and Diagrams (ORTS-NAV)	Note 15
CSOSS Book 1.4	Master Set – Procedures and Diagrams (XCOM-ICOM)	Note 15
CSOSS Book 1.5	Master Set – Procedures and Diagrams (AUXA-ACTS)	Note 15
CSOSS Book 2	Installation Record	Note 15
CSOSS Book 3	CSOSS Users Guide	Note 15
CSOSS Book 4	Drill Guides	Note 15
CSOSS Book 5	Battle Short Guide	Note 15
CSOSS Book 6	CSOOW Guide	Note 15
CSOSS Book 10	AAWC Operator	Note 15

CSOSS Book 14	ASUWC Operator	Note 15
CSOSS Book 18.1	AWS Supervisor (Procedures)	Note 15
CSOSS Book 18.2	AWS Supervisor (Support Data)	Note 15
CSOSS Book 18.3	AWS Supervisor (System Interface Diagrams)	Note 15
CSOSS Book 24.1	Computer Central Space Book	Note 15
CSOSS Book 24.2	Computer Central (AWS)	Note 15
CSOSS Book 24.3	Computer Central (SWS)	Note 15
CSOSS Book 24.4	Computer Central (UWS)	Note 15
CSOSS Book 24.5	Computer Central (ESS)	Note 15
CSOSS Book 30	CSC/CSRO Operator	Note 15
CSOSS Book 31.1	CSOOW (Initialization)	Note 15
CSOSS Book 31.2	CSOOW (Casualty Control)	Note 15
CSOSS Book 31.3	CSOOW (Ordnance)	Note 15
CSOSS Book 31.4	CSOOW (Support Data)	Note 15
CSOSS Book 31.5	CSOOW (System Interface Diagrams)	Note 15
CSOSS Book 33	Display Technician	Note 15
CSOSS Book 44	MSS Operator	Note 15
CSOSS Book 46	ORTS Operator/Technician	Note 15
CSOSS Book 52	RSC Operator	Note 15
CSOSS Book 59	SPY/FCS Radar Technician	Note 15
CSOSS Book 60	SPY/FCS Radar Technician	Note 15
CSOSS Book 61	SPY Radar Technician	Note 15
CSOSS Book 64	SWS Operator	Note 15
CSOSS Book 65	SWS Supervisor	Note 15
CSOSS Book 68	TIC Operator	Note 15
CSOSS Book 78/79	400-Hz Technician	Note 15
DATAPRODUCTS CORP 267720	Operator's Guide, B-Series Line Printers, with Acoustic Cabinet	Note 1
DATAPRODUCTS CORP 267726	Maintenance Guide, B-Series Line Printers, with Acoustic Cabinet	Note 1
DATAPRODUCTS CORP 267788	Master Support and Logistics Guide, B-Series Line Printers, with Acoustic Cabinet	Note 1
JMCIS/NTCS-A-TM-001	JMCIS/NTCS-A Unified Build 2.2 Training Manual	Note 11
JMCIS/NTCS-A-UG-001 Vol. 1	JMCIS/NTCS-A Unified Build User's Guide Volume I	Note 11
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MIL-STD 1310F	Shipboard Bonding, Grounding, and Other Techniques for Electromagnetic Compatibility and Safety	Note 1
MIL-STD 2000	Standard Requirements for Soldered Electrical and Electronic Assembly	Note 1
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MIP 4111/003 (Series)	OJ-451 Computer Display Console	Note 1
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MIP 4111/018 (Series)	OJ-663 Computer Display Console	Note 1
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MIP 4121/004 (Series)	Recorder-Reproducer Set RD-358	Note 1
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MIP 4121/R12 (Series)	OA-7984 Input/Output Console	Note 1
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NAVEDTRA B72-01-00-92	NEETS Module 1, Introduction to Matter, Energy, and Direct Current	Note 1
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NAVEDTRA 172-17-00-84	NEETS Module 17, Radio-Frequency Communications	Note 1
NAVEDTRA 172-18-00-84	NEETS Module 18, Radar Principles	Note 1
NAVEDTRA B72-19-00-92	NEETS Module 19, The Technician's Handbook	Note 1
NAVEDTRA B72-21-00-87	NEETS Module 21, Test Methods and Practices	Note 1
NAVEDTRA B72-22-00-88	NEETS Module 22, Introduction to Digital Computers	Note 1
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NAVELEX 0967-LP-374-7050	Programmed Instruction Handbook for Decoder Group AN/UPA-59(V)2	Note 1
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NAVSEA E9407-AA-SUP-010	Electromagnetic Compatibility Criteria for Surface Weapon Systems	Note 1
NAVSEA OD 45879	Cable and Connector Repair	Note 1
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NAVSEA STD 407-5287561	Industrial Electromagnetic Compatibility (IEMC) Work Process Instructions	Note 1
NAVSEA S0752-AA-SPN-010/ SCLSIS	Ship Configuration and Logistics Support Information System, TEC SPEC 9090-700A	Note 1
NAVSEA S9522-AA-HBK-010	Magazine Sprinkler Systems Description, Operation, and Maintenance Handbook	Note 1
NAVSEA S6230-BQ-MMO-010	Toxic Gas Damper Control System	Note 1
NAVSEA S8000-AB-AEG-010	AEGIS Combat Trainer System MK 29 Description, Operation, and Maintenance	Note 1
NAVSEA S9314-A4-MMA-010	Frequency Static Converter Group MK 84 MOD 1	Note 1
NAVSEA S9410-AM-AEG-010	AEGIS Combat System Console Operator Introduction Manual	Note 1
NAVSEA S9410-AM-AEG-040/ (C)	Coordinator's Operating Procedures (Doctrine Application)	Note 1
NAVSEA S9410-AL-AEG-060	AEGIS Combat Trainer System (ACTS) Operator, Operating Principles and Procedures (DDG 51)	Note 1
NAVSEA S9410-AL-AEG-330	AEGIS Post-Mission Analysis	Note 1
NAVSEA S9514-B9-MMM-010	Dehydrator, Low Pressure Air, Desiccant Type Electronic Dry Air System, Type II	Note 1
NAVSEA S9536-AJ-AEG-010	Demineralizer/Water Cooler HD-1077	Note 1
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NAVSEA SE251-DG-MMO-010	Indicator Group AN/SPA-25G (General Information and Safety Precautions, Chapter2, Operation)	Note 1
NAVSEA SE600-AA-MMM-010	Operation and Maintenance Instructions for Recorder-Reproducer Set, Magnetic Disk AN/UYH-3(V)	Note 1
NAVSEA SE600-AA-MMM-020	Diagrams and Schematics for Recorder-Reproducer Set, Magnetic Disk AN/UYH-3(V)	Note 1
NAVSEA SE600-AA-MMM-030	Illustrated Parts Breakdown for Recorder-Reproducer Set, Magnetic Disk AN/UYH-3(V)	Note 1
NAVSEA SE600-AA-MMM-040	Programmer's Reference Manual for Recorder-Reproducer Set, Magnetic Disk AN/UYH-3(V)	Note 1

NAVSEA SE600-AA-MMM-050	Programmer's Reference Manual for Recorder-Reproducer Set, Magnetic Disk AN/UYH-3(V)	Note 1
NAVSEA SE610-AV-MMO-010	Data Processing Set AN/UYK-20	Note 1
NAVSEA SE610-AW-MMA-010	Technical Manual for Operation and Maintenance Instructions for Computer Set AN/UYK-7(V)	Note 1
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NAVSEA SE610-PV-MMO-010	Data Processing Set AN/UYK-44 Organization Level Maintenance	Note 1
NAVSEA SE640-AD-MMO-010	Input/Output Console OJ-172 Vol. 1 Chap 1,2,4,6,7 & 8	Note 1
NAVSEA SE640-AD-MMO-020	Input/Output Console OJ-172 Vol. 2 Chap 3 & 5	Note 1
NAVSEA SE640-AD-MMO-030	Input/Output Console OJ-172 Vol. 3 Chap 9	Note 1
NAVSEA SE640-AV-MMO-010	AN/USQ-69 Data Terminal Set Operation and Maintenance Instructions w/Parts Lists	Note 1
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NAVSEA SE641-AE-MMO-020	Maintenance Manual for Digital Magnetic Tape Recorder-Reproducer RD358A	Note 1
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NAVSEA SE685-AF-MMM-130	Detailed Functional theory and Reference Manual for Display Control Console OJ-471	Note 1
NAVSEA SE685-AJ-MMM-010	Console OJ-454(V) Description and Operation	Note 1
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NAVSEA SE686-BV-MMO-030	Amplifier Pulse Symbol Generator AM-4534 & AM 4968/UYA-4	Note 1
NAVSEA SE686-BV-MMO-130	Azimuth Symbol Converter Group OU-91/UYA-4 (CV-3057 & SG1051)	Note 1

NAVSEA SE686-CA-MMO-020	Technical Manual for Advanced Display System Combat System Console AN/UYQ-70(V), Description, Operation, and Maintenance	Note 1
NAVSEA ST890-A3-AEG-010	Operational Readiness Test System MK 7 Description, Operation and Maintenance	Note 1
NAVSEA SW010-AF-ORD-010	Identification of Ammunition	Note 1
NAVSEA SW221-JO-MMO-010	PHALANX Weapon System MK 15 Mod 12	Note 1
NAVSEA SW225-AO-MMA-010	Theory of Combat System Alignment	Note 1
NAVSEA SW225-BN-CSA-010	Combat Systems Alignment Manual (CSAM) for CG-47 Class	Note 1
NAVSEA SW225-CL-CSA-010	Combat System Alignment Manual	Note 1
NAVSEA SW230-A0-SOM-090	Target Acquisition System MK 23 Mods 5 thru 8, Console Operator's Manual	Note 1
NAVSEA SW230-EO-MMA-010	DTD MK24 with Control Unit, Status Panel, and Switching Panel, D,O,M, and IPB	Note 1
NAVSEA SW235-CB-MMO-010	Gun Fire Control System MK 86 Mods 8,9,10, and 12, Description Operation, and Maintenance	Note 1
NAVSEA SW261-AJ-OPI-020/ (C)	DDG 993 NTU MR Missile General Description	Note 1
NAVSEA SW261-AJ-OPI-030/ (C)	DDG 993 NTU MR Missile Functional Description	Note 1
NAVSEA SW261-C5-MMO-010	HARPOON Weapon System	Note 1
NAVSEA SW261-C7-SOM-010	HARPOON Weapon System AN/SWG-1A Operators Manual	Note 1
NAVSEA SW261-HT-MMO-020	HARPOON Weapon System AN/SWG-1A Description, Operation, and Maintenance	Note 1
NAVSEA SW261-PO-MMO-010	TOMAHAWK Weapon System MK 37	Note 1
NAVSEA SW261-Q2-MMO-090	Guided Missile Fire Control System MK 91 MODS 2 & 3; Radar Target Data Processor Fault Oriented Interconnection Diagrams	Note 1
NAVSEA SW261-Q2-MMO-100	Guided Missile Fire Control System MK 91 MODS 2 & 3; Radar Set Console Fault Oriented Interconnection Diagrams	Note 1
NAVSEA SW261-Q2-MMO-110	Guided Missile Fire Control System MK 91 MODS 2 & 3; Director Receiver Fault Oriented Interconnection Diagrams	Note 1
NAVSEA SW261-Q2-MMO-120	Guided Missile Fire Control System MK 91 MODS 2 & 3; Transmitter Fault Oriented Interconnection Diagrams	Note 1
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NAVSEA SW269-BA-MMO-160	Tomahawk Weapons Control System AN/SWG-4 Description, Operation, and Maintenance	Note 1

NAVSEA SW271-A7-AEG-010	AEGIS Weapon System Maintenance and Readiness	Note 1
NAVSEA SW271-B1-AEG-010	FCS MK 99	Note 1
NAVSEA SW272-AD-AEG-010	AEGIS Radar AN/SPY-1D Index	Note 1
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NAVSEA SW800-AB-MMO-010	Standard Missile Series RIM-66	Note 1
NSTM, Chapter 090	Inspections, Tests, Records and Reports, NAVSEA S9086-CZ-STM-000	Note 1
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NSTM, Chapter 400	Electronics, NAVSEA S9086-ND-STM-000	Note 1
NSTM, Chapter 408	Fiber Optic Topology, Operation, Maintenance and Repair, NAVSEA S9086-PF-STM-010	Note 1
NSTM, Chapter 491	Electrical Measuring and Test Instruments, NAVSEA S9086-Q5-STM-000	Note 1
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NSTM, Chapter 532	Liquid Cooling Systems for Electronic Equipment, NAVSEA S9086-SD-STM-010	Note 1
NSTM, Chapter 551	Compressed Air Plants and Systems; NAVSEA S9086-SY-STM-010	Note 1
NSTM, Chapter 670	Stowage, Handling, and Disposal of Hazardous General Use Consumables, NAVSEA S9086-WK-STM-010	Note 1
NSTM, Chapter 700	Shipboard Ammunition Handling and Stowage, NAVSEA S9086-XG-STM-010	Note 1
NSTM, Chapter 772	Cargo and Weapons Elevators, NAVSEA S9086-ZN-STM-010	Note 1
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NWP 1-03.35	Joint Reporting System Naval Surface Fire Support Messages	Notes 1 & 5

NWP 3-01.01	Antiair Warfare, Ch. 3, 4, App E	Note 1
NWP 3-01.10	Antiair Warfare Commander's Manual	Notes 1 & 5
NWP 3-20.32	Naval Surface Gunnery	Notes 1 & 5
NWP 3-20.71	Antiship Cruise Missile Employment Manual	Notes 1 & 5
NWP 4	Basic Operational Communications Doctrine	Note 1
NWP 32	Antiair Warfare	Note 1
NWP 62-2A	Surface Ship TOMAHAWK Weapon System and Tactics	Note 1
NWP 63	Surface Ship AAW Tactics	Note 1
NWP 64-2-1	Surface Launched HARPOON Weapon System and Tactics	Note 1
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OPNAVINST 3120.32	Standard Organization and Regulations of the U.S. Navy	Note 8
OPNAVINST 4790.4C	Ships' Maintenance and Material Management (3-M) Manual	Note 1
OPNAVINST 5100.19 VOLUME 1	Navy Occupational Safety and Health Program Manual for Forces Afloat, Volume 1	Note 8
OPNAVINST 5100.19 VOLUME 2	Navy Occupational Safety and Health Program Manual for Forces Afloat, Volume 2	Note 8
SECNAVINST 5510.30A	Department of the Navy Personnel Security Program	Note 1
SECNAVINST 5510.36	Department of the Navy (DON) Information Security Program (ISP) Regulation	Note 1
SPCCINST 4441.170	COSAL Use and Maintenance Manual	Note 1
SPCCINST 8010.12	Supply Management of Ammo	Note 1
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	TDMIS Report	Note 1

**LEGEND:**

Note 1 -- To order, MILSTRIP to NAVICPPHILA or  
via INTERNET <http://www.nll.navsup.navy.mil>

Note 2 -- National Imagery and Mapping Agency (NIMA)

Note 3 -- INTERNET <http://www.dtic.mil/doctrine/jel/index.html>

Note 4 -- Available via INTERNET <http://www.spear.navy.mil/JFMM>

Note 5 -- NTIC Series B1 (CD-ROM) (See your command NWP custodian)

Note 6 -- Refer to the instruction for the platform you are currently on. Questions will be of a general nature.

Note 7 -- Point-of-Contact: Downloaded from COMNAVCOMTELCOM's bulletin Board Service (BBS); ALCOM 020/96 refers. If the document is classified, refer to note 1.

Note 8 -- INTERNET <http://neds.nebt.daps.mil/>

Note 9 -- Ltr request to: Chief of Naval Operations N62  
2000 Navy Pentagon  
Washington, D.C. 20350

Note 10 - NTIC Series A (CD-ROM) (See your NWP Custodian)

Note 11 - Ltr request to: Space and Naval Warfare Systems Command  
Information Management Systems Program  
(PD 60)  
Washington, D.C. 20363-5100

Note 12 -- Commercial purchase

Note 13 - Fleet Publications Library CD-ROM Letter Request to:  
Commanding Officer  
CD-ROM Team Code N911  
NCTAMSLANT  
9625 Moffett Ave  
Norfolk, VA 23511-2784

Note 14 - Ltr Request to: Commander  
Naval Surface Forced U.S. Atlantic Fleet  
ATTN: Code N002A2  
1430 Mitscher Ave  
Norfolk, VA 23551-2494

Note 15 - These pubs are furnished to the ships who have CSOSS installed onboard. Ships that do not have CSOSS should refer to the System Operational Manuals for their class ship.

Note 16 - Ltr Request to: Commanding Officer  
Communications Security Material System  
3801 Nebraska Ave. N.W.  
Washington, D.C. 20393-5252